MAY 23 1917
UNIV. OF MICH. LIBRARY

MAY 15, 1917.

WHOLE SERIES, VOL. [illegible] No 5. THIRD SERIES, VOL. XXXIII.

Lib Dept of Mich. 1 year 18

The THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of Practical Therapeutics

Edited by

H. A. Hare, M.D.

Professor of Therapeutics and Diagnosis in the Jefferson Medical College,

GENERAL THERAPEUTICS,

and

Edward Martin, M.D.

Professor of Surgery in the University of Pennsylvania,

SURGICAL AND GENITO-URINARY THERAPEUTICS.

EDITORIAL OFFICE, N. W. Cor. 18th and Spruce Streets, PHILADELPHIA, PA.

SUBSCRIPTION RATES:

United States and Mexico, one year,	Two Dollars.
Canada, one year,	Two Dollars and Fifty Cents.
Foreign Countries (postage prepaid), one year,	Ten Shillings.

E. G. SWIFT, Publisher, DETROIT, MICHIGAN, U. S. A.

FOREIGN OFFICES:

LONDON, ENGLAND—19 & 20 Great Pulteney St., W. SYDNEY, N. S. W., AUSTRALIA—125 York St.
WALKERVILLE, ONT., CANADA. MONTREAL, QUE., CANADA—118 St. Paul St., W.
BOMBAY, INDIA—70 Hornby Road.

Entered at the Post-Office at Detroit, Mich., as second-class mail matter.
COPYRIGHT, 1917, BY E. G. SWIFT.

An Effective Remedy *for*
Nervous Sleepless Patients

NEURONIDIA

Palatable **Well-Tolerated** **Reliable**

Allaying Restlessness and Producing Refreshing Sleep.

Especially indicated in insomnia from mental strain, neurasthenia and other neuroses; also an excellent sedative in sea-sickness.

Literature on Request

Schieffelin & Co.
NEW YORK

Important Therapeutic Indications in Diseases of the Urinary Tract

Fulfilled by

URIFORM

Highly recommended in the treatment of

CHRONIC URETHRITIS **VESICAL CATARRH**
PROSTATITIS **VESICULITIS**
PYELITIS

BECAUSE:

It sterilizes the Urine ***Reduces Congestion***
Arrests Discharge ***Allays Pain***

DOSE: One to two teaspoonfuls three times daily.

Literature and Sample on request.

Schieffelin & Co.
New York

THE THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE.

Whole Series, Vol. XLI. | DETROIT, MICH., MAY 15, 1917. | Third Series, Vol. XXXIII, No. 5.

ORIGINAL COMMUNICATIONS.

WHAT NEUROLOGISTS SHOULD KNOW ABOUT ELECTROTHERAPEUTICS.[1]

BY CHARLES S. POTTS, M.D.,

Neurologist to the Philadelphia Hospital; Consulting Neurologist to the German Hospital, Philadelphia.

The title of this paper is to some extent a misnomer, as what I have to say applies not only to neurologists but to all who treat patients suffering from the disorders herein mentioned. That these are diseases of the nervous system is true; that only neurologists treat them is of course not true. Electricity as a therapeutic agent was first principally employed in nervous diseases, and the first attempts to place it upon a scientific basis were in large part made by workers in neurology such as Duchenne, Remak, and Erb. Among the first teachers in this city was Charles K. Mills. While from this time to the present legitimate indications for its use have increased considerably, it is still associated in the minds of many practitioners only with these disorders.

That electricity is a valuable therapeutic agent in many of these when properly used there can be no doubt. That it is often not properly used is the excuse for this paper, its principal object being to call attention to harmful errors which are often committed when applying it and also to the value of certain modern methods.

Time will not permit of a detailed description of the method of making the more ordinary applications, and it is assumed that to some extent at least they are familiar to all.

In applying electricity intelligently, the physiological effects must be borne in mind, and those of special importance in the treatment of nervous diseases are the mechanical, electrotonic, thermic, counter-irritant, and psychic. The utilization of the mechanical effects is one of the most important of its uses. By this meaning the production of muscular contractions in paralyzed or weakened muscles—in other words, as a method of obtaining passive exercise. Various forms of current may be used for this purpose, those most commonly employed, owing probably to the facts that they were the first forms of current used systematically in medicine and that apparatus for producing them is more easily available, being the faradic or induced and the galvanic or constant. The sinusoidal current in many cases has advantages over both of them. To obtain muscular contractions there must be a sudden increase and decrease in the current strength—in other words, a constant current without interruption will not cause muscular contraction. The advantages of the sinusoidal current, by which is meant an alternating current, in which the increase and decrease in the current strength are made more or less gradually, are that it is not painful. This is owing to the gradual change in current density. In the faradic current this is very sudden. Second, it does not cause electrolytic or irritating effects as does the galvanic current. Third, it causes marked contraction of the involuntary muscle fibers, as for instance those of the intes-

[1] Read before the Philadelphia County Medical Society, Feb. 14, 1917, as part of a symposium on Electrotherapeutics.

tines. Mistakes frequently made when using the current for the purpose above mentioned are:

1. *Using it when the cause of the paralysis is an acute inflammation.* This may cause serious harm, and it may be stated as an electrotherapeutic axiom to never cause muscular contractions until acute inflammation has subsided. Therefore, in the acute stages of myelitis, neuritis, or immediately after an apoplectic attack the current should not be used for this purpose.

2. There seems to be a tendency to use too strong currents and to cause too many contractions. This is especially dangerous when there is disease of the peripheral motor neuron—*i.e.*, either the cells composing the cranial motor nerve nuclei, or those in the anterior horns of the spinal cord and the peripheral nerves coming from them. In such cases there is more or less degeneration of the muscle fibers, and overstimulation will cause exhaustion and destruction of the remaining vitality and hence do harm. It should, therefore, be the rule in such cases to use a current just strong enough to cause contraction and to cause only a few at each sitting, and to allow a brief period of rest after each one. When using the sinusoidal current this is done automatically. It is well also to only give the treatment every other day. If contraction can only be obtained by the use of very strong currents, as may sometimes be the case, it may be well to postpone such treatment until some return in power has been obtained by other methods. This rule applies with special force to anterior poliomyelitis, where overtreatment may cause great harm. It is also true, however, that in these cases treatment should be continued for months even if no improvement is manifest. If treatment be persisted in good results are usually eventually obtained.

3. Not using the proper current. In discussing which current to use in his lectures on therapeutics, Dr. H. C. Wood employed the dictum, "Use the current which gives the best contraction with the least pain." In a large measure this rule still holds good. In paralysis due to disease of the peripheral neuron, the muscles frequently will not respond to the faradic current. As the principal value of the treatment is the exercising of the muscles by causing contractions, it will readily be seen that to employ the faradic current in such cases is worse than useless. In these either the galvanic or sinusoidal currents should be used.

4. No attention is paid to the pole used. In the case of faradic or sinusoidal currents this is not so important, as they are alternating in character. It is of importance when the galvanic is used. The poles then manifest the so-called electrotonic effects, by which is meant that the positive pole causes decreased irritability or sedative effects in the nerves in its vicinity (anelectrotonus), and the negative pole increased irritability or excitation (catelectrotonus). Therefore, as a general rule it may be stated that when it is desired to improve the action of weakened muscles and nerves, the negative pole should be placed over them, or in other words be the active pole.

5. Frequently the wrong muscles are treated. This may be the case when the diseased muscle or muscles are not picked out by proper examination and when attention is not paid to their motor points in giving the treatment. It most frequently happens in treating hemiplegia resulting from apoplexy. In such cases contractures, due to overpowering of the extensors by the stronger flexors, frequently result. In such cases the rational procedure would seem to be an endeavor to improve the condition of the extensors, and the writer some years ago noticed that by confining electrical treatment to these muscles, contractures were frequently benefited that otherwise would not have been. Frantz, Sheetz, and Wilson (*Jour. Amer. Med. Assoc.*, Dec. 18, 1915) have recently called attention to the importance of only treating the extensors in such cases.

Both the mechanical and electrotonic effects may be utilized sometimes with advantage for the treatment of pain. This if due to myositis or the so-called muscular rheumatism, sometimes mistaken for neuritis, may be relieved by the application over

the painful parts of either a very rapidly interrupted faradic or sinusoidal current. The electrotonic effect of the galvanic current may also be so utilized by applying the positive pole or anode over the affected parts. This, as has been previously stated, is sedative in its influence. When so used the current of course must not be interrupted, should be increased and decreased in strength very gradually, and the other electrode must be at some distance away. The positive pole of the galvanic current similarly applied to the skin over peripheral nerves may relieve neuralgic pains. This is especially true of so-called neuralgia of the trigeminal nerve that may be due to infections, intranasal congestions, etc. I do not mean true tic-douloureux. In these cases the electrode must be placed successively over the so-called tender points, viz., as the supraorbital, infraorbital, and mental foramina. I have seen the pain of an acute neuritis relieved either by this method or by passing the current along the course of the nerve for ten minutes or more. In such cases, as has been previously stated, great care must be used not to cause muscular contractions.

It is well known to any one who has used electricity that the passage of a current through a conductor will generate more or less heat. Until the perfection of apparatus for the employment of the high-frequency current for therapeutic use, this property could not be utilized, for the reason that painful muscular contractions would be produced, and in the case of the galvanic current its electrolytic action would cause destruction of tissue.

By a high-frequency current we mean in general terms a current produced by the oscillating discharge from a condenser, as a Leyden jar, through a circuit of low resistance, as a metal coil. This current is alternated with great frequency. Thus, while the oscillation of the ordinary faradic current may be a few hundred a second, those of the high-frequncy current may be counted in the millions. High-frequency currents also differ somewhat in characteristics, there being the D'Arsonval, which is one of the low potential; the Tesla, which is of high potential; and the Oudin or resonator current, which is also of high potential, but is unipolar. Either the D'Arsonval or Tesla current may be used for the generating of heat in the tissues, the former being probably the preferable one. Heat so produced will involve all the tissues between the two electrodes, therefore can be made to penetrate much deeper than can be done by other means of applying external heat. The heat will also remain longer after the application ceases. A local hyperemia is produced under the electrodes and the sweat glands stimulated. This property has been termed "diathermy or electric thermo-penetration." It will readily be seen that such properties should be of great value in the treatment of inflammation, and among nervous diseases this is especially manifested in the treatment of subacute or chronic neuritis. Electrodes of pliable block tin are best, one of which should be applied over the affected nerve and the other on the opposite side, where they can be held with a bandage or adhesive strips. They must be far enough apart to prevent sparking, and for the same reason the edges must be either rounded or bound with adhesive strips and the electrode placed in close contact with the skin. These electrodes may differ in size according to the locality in which they are used. For instance, over the brachial plexus they should be about 2 by 4 inches. The amperage or current strength should also depend on the size of the electrodes, in direct ratio. It should vary from ½ to 1½ amperes, and the application continue for ten minutes or longer. I have also gotten good results by placing the electrodes one below the other along the nerve trunk. In the treatment of sciatica especially, too much cannot be said for this method. The vacuum electrode also causes heating of the tissues and an intense local hyperemia, and may be used in similar conditions. For its use the resonator current can be employed. It will be found useful in that stubborn condition known as brachial or radicular neuritis, in which there is great pain in the course of the brachial plexus and very slight motor disturbance. It may also be

of some value in the treatment of the paralysis due to anterior poliomyelitis, for the purpose of improving the circulation of and heating the affected limbs, which as is well known are usually exceedingly cold and cyanotic.

Myositis, as, for instance, lumbago, is speedily relieved by the use of these methods. The static wave current has been highly recommended for the treatment of chronic neuritis, but I have had no experience with it.

Electricity has been recommended for all organic diseases of the brain and cord. From a knowledge of the character of the lesions present in these conditions, it does not seem probable that it can have any curative effect. It may, however, relieve some of the symptoms. Thus a rapidly interrupted faradic current applied to the limbs with a dry brush electrode sometimes relieves tabetic pains; other forms of application have also been advised for this purpose. Paralyzed sphincters also in some cases may be strengthened.

Electricity has also been much advised for the treatment of the various neuroses. Here its psychic effect undoubtedly may have considerable influence. In addition, in certain cases, it may do more than this. Thus in neurasthenic conditions—and it is important to remember that they may be due to a number of causes, many of them organic—certain symptoms may be relieved. High-frequency currents applied with a vacuum electrode to the spine may relieve the backache.

The static breeze will often relieve the headache. The sinusoidal current may be of service in correcting constipation and improving the tone of muscular coats of the intestines. As part of the so-called "rest cure," the use and value of the faradic current as a means of passively exercising the muscles is well known. As the employment of high-frequency currents by autocondensation improves metabolism, another indication present in many of these cases is apparent. It should not be so employed if the blood-pressure is low.

I am well aware that the use of electricity in its various forms has been advised for many other disorders of the nervous system that I have not mentioned, and also that different procedures have been advised for the treatment of those that I have named. What I have stated I have found valuable in my own experience.

SPECIFIC TREATMENT IN PULMONARY TUBERCULOSIS.[1]

BY GILBERT T. BROWN, M.D., DAYTON, OHIO.

In presenting my clinical experiences and results in the treatment of pulmonary and other forms of tuberculosis during the last twelve years, it is with the belief that the methods of treatment which were employed will be helpful to those who still depend upon the usual hygienic and dietetic methods alone, as I had done myself during the preceding years of my practice.

Like others I found that the majority of tuberculous patients are unwilling and many of them entirely unable to seek their recoveries away from home under the care of specialists or in private sanatoria, and also that the commonly practiced methods are to say the least but rarely successful. Indeed, I do not remember a single case of the disease in which I accomplished a complete clinical recovery prior to my inclusion of specific remedies in their treatment.

In 1904 my attention was attracted to the watery extract of tubercle bacilli, as used by Dr. Karl von Ruck in his sanatorium for tuberculosis in Asheville, N. C. I have used this preparation upon most of the patients under consideration. More recently I have also used his vaccine against tuberculosis, and the results obtained and to be related will make apparent the benefits which my patients derived.

I am in a position to report upon the re-

[1]Read before the Montgomery County, Ohio, Medical Society, February 2, 1917.

sults in fifty-two cases which were treated by me since 1904, and in so far as the patients are still living they have been kept under observation to the present time.

Of these cases twenty-two, or 42.3 per cent, were in a comparatively early stage; thirteen, or 25 per cent, in a moderately advanced stage; and seventeen, or 32.5 per cent, were in the far advanced stage of the disease, at the time when the specific treatment was first employed.

Not desiring to detain you with the details of the case histories of these patients, and yet wishing to give some data of their condition when they came under my care and on their discharge, I give the essentials, especially of the most important features which were observed.

The *nutrition* in tuberculosis often suffers at a quite early period, and all excepting two of my patients had lost weight which varied from five to fifty pounds, averaging about twenty-one pounds.

After discontinuing treatment forty-five patients showed gains in weight varying from five to forty-five pounds and averaging about eighteen pounds; five patients had either shown no gain or had continued to lose.

It seems to me that the improvement noted in nutrition is in itself indicative that the patients profited by the dietetic regimen which was followed; the specific treatment favored a better metabolism and improved the patients' appetite, and assimilation became so strikingly apparent in certain instances that there could be no doubt of the relation, because their appetite improved promptly when for weeks and months there had been no desire for food, and the steady decline in weight ceased and was followed by a prompt and steady increase. Four patients with apparently severe gastric complications, and whose stomachs rejected almost everything and could digest but little, were able to digest full, generous meals at the end of the first month without the aid of other therapeutic measures.

Fever was absent in only five or 9.6 per cent of my patients. In twenty-eight it was moderate in degree, not exceeding a maximum of 101.5°. In nineteen it ranged higher, especially in the far-advanced cases; maxima of 102° were frequently noted; and in several instances the afternoon temperature was 103°, and in one case 104°, Fahrenheit.

On discontinuing the treatment the temperature was normal in thirty-six, or 69.2 per cent; it did not exceed 100° F. in eight, or 15 per cent. In the other cases, in which the type of the pulmonary disease was as a rule pneumonic and mixed infection appeared to dominate the clinical course, the fever continued unabated, or was but slightly less than on admission.

Cough and expectoration was as yet absent in seven, or 11.7 per cent, of my early-stage cases. These symptoms were slight in twenty-three, or 45 per cent; moderate in degree in fourteen, or 24.9 per cent; and severe in eight, or 15.6 per cent. Tubercle bacilli were found in the sputum in twenty-nine, or 58.8 per cent.

On discontinuance of specific treatment there was no cough or expectoration in twenty-eight, or 53.8 per cent; only slight in fourteen, or 27.4 per cent; moderate in six, or 11.7 per cent; and severe in four, or 7.8 per cent. Tubercle bacilli were absent in thirty-seven, or 71.1 per cent, and were found in fifteen, or 28.8 per cent.

Mixed infections. Other pathogenic microörganisms were found in twenty-five, and in twelve, or nearly half, of them their relation to the clinical course appeared probable in that the type of the fever was hectic, reaching maxima of 102° and over. The organism in relation was as a rule a pneumococcus; in a few cases the influenza bacillus was found. In several of these patients the associated infection yielded to stock vaccines, of which I availed myself in more recent years, and which would probably have prevented several failures in my earlier cases.

Hemoptysis. Pulmonary hemorrhages had occurred prior to treatment in several of my patients; none occurred during the administration of watery extract or of the vaccine, although marked focal reactions occurred repeatedly in the affected lungs in almost all cases. In one patient, treated in 1913, slight hemoptysis, amounting to less

than one ounce, occurred after the treatment was discontinued, which caused its resumption, and the patient has since continued in good health.

Night sweats. Before being treated, night sweats had occurred regularly in six and occasionally in eleven of the patients. This symptom was still present on discharge, in four of whom the treatment had also failed to cause other improvement.

Tuberculous complications. Tuberculosis of the larynx of a marked degree was recorded in eight cases, four of which showed ulceration and belonged to the far-advanced class of progressive phthisis. One of them treated in 1905 recovered, and is still in good health; of four cases in which the laryngeal affection was well marked but had not progressed to a stage of ulceration, two treated in 1907 recovered and are still in good health. In numerous other instances, slighter symptoms, such as hoarseness, were present or focal reactions occurred in the larynx, but owing to my limited experience in laryngology I could not make a positive diagnosis. I therefore leave them out of consideration, but if those cases represented tuberculosis of the larynx in an early stage, recovery followed in all of them.

Tuberculosis of abdominal organs, including intestines, genitalia, and peritoneum, was diagnosed in seven cases, six females and one male. An interesting feature in all of them was the occurrence of focal reactions which manifested themselves by increase of the local symptoms. In two of these patients treated in 1906 and 1907, and in whom tuberculosis of the intestine and pelvic organs was a complication of the pulmonary disease, complete recovery followed, and both are well at this time. Another case treated two years ago, with parametritis on the left side and marked focal reaction in the lower part of abdomen and the rectum, was greatly improved; her pulmonary symptoms having disappeared she discontinued treatment. She has continued in a fair state of health. A fifth case treated in 1914 had previously been operated upon for rectal stricture; she had a rectovaginal fistula. A Wassermann reaction was positive, and positive focal reactions were likewise observed on the administration of the von Ruck vaccine. Another operation became necessary on account of the rectal stricture, and succinimide of mercury was thereafter administered for nearly a year. This patient recovered from her pulmonary tuberculosis, and recent reports indicate improvement of the rectal affection. The other two patients succumbed to their disease.

Tuberculosis of bones and joints was present in three of the cases. One case of tuberculosis of the knee-joint treated in 1907 in a far-advanced stage of phthisis recovered from both his joint and pulmonary disease and has continued in good health since.

Tuberculosis of the vertebra was found in two cases; in one the first dorsal vertebra was involved, but the pulmonary disease was comparatively slight; this patient also had pelvic tuberculosis and probably also tubercle in the intestine; marked focal reactions followed the administration of the vaccine in the vertebral lesion and were attended with sharp attacks of diarrhea. This patient has also apparently recovered. The other case of spondylitis of first and second dorsal vertebræ had no active lesions in the lungs, and the focal reactions, which were well marked, were limited to the vertebræ. The reactions grew less and eventually ceased. This patient is still under observation, having markedly improved. He is wearing a brace, and the spinal curvature is becoming markedly less.

Non-tuberculous complications were observed in a considerable number of the patients under consideration, especially in the moderately advanced and far-advanced stage. Several such complications were at times present in the same case, and the pulmonary disease was further complicated by extra-pulmonary tuberculous affection and by mixed infections to which I have already referred. In other cases anemia, albuminuria—with or without casts—gastric catarrh, and gastroptosis, cholecystitis, malaria, chronic nephritis, and syphilis were recorded on their admission. Altogether there were fifty instances of non-

tuberculous affections coexisting, which were treated with success in twenty-three instances; twelve other cases improved, and in the remainder no material improvement could be observed.

Considering this clinical material as a whole it is evident that a considerable number offered formidable obstacles, both on account of the advanced stage of the pulmonary disease and of the complications that were present.

A tabulation of the clinical results observed shows that recovery occurred in all of the twenty-two patients who were in a comparatively early stage. Seven of the thirteen moderately advanced cases of phthisis recovered; three cases were improved sufficiently that the disease could be considered as arrested; three others were improved. In the seventeen patients of the last stage of phthisis only two recoveries occurred. The disease was arrested in three and improvement was noted in three others. No result at all was obtained in nine cases. This totals for all stages thirty-one recoveries, or 59.6 per cent; six arrestments, or 11.5 per cent; with lesser degrees of improvement in six others, including the coexisting complications.

Of great interest appears to me the permanency of the clinical results. All except one of the patients here considered have been traced, and most of them have been under more or less continued observation. The results as determined at the present time are as follows:

Early stage, 22 cases: All are living; eighteen are in good and three in a fair state of health, without recurrence of their tuberculosis; one could not be traced, but it was a mild case and the recovery appeared complete; it is not probable that a relapse occurred.

Six patients who were treated in this stage were dismissed ten to twelve years ago. Four patients were dismissed between six and ten years ago.

Twelve patients were dismissed since 1910.

Moderately advanced, 13 cases: All are living; ten are in good and three patients in a fair state of health, without relapse since their dismissal.

Nine patients were dismissed ten to twelve years ago.

Four patients were dismissed since 1910.

Far-advanced stage, 17 cases: Six are living; four are in good health, and two patients have continued in fair health without relapse since their discharge. In seven patients the disease progressed; three patients, after having improved, experienced a relapse; all have died since their treatment; one died of acute nephritis seven years after her complete recovery, during which she enjoyed good health and had gone through two pregnancies, and both children so far as I am informed are living and in good health. Of the six patients now living four were treated ten to twelve years ago, one eight years ago, and the other was dismissed during the present year.

CONCLUSION.

With only ten deaths from tuberculosis, all of which occurred in instances of far-advanced consumption, and the remainder living in good or fair health without relapse after their apparent recoveries and after periods up to twelve years, I feel justified in concluding that great aid from the specific remedies applied has accrued to the forty-two of fifty-two patients, forty-one of whom are now living in good and fair states of health. Without specific treatment added to the ordinary hygienic and dietetic methods my results in the treatment of tuberculosis prior to its adoption were practically negative.

My experiences also show that specific remedies can be applied by general practitioners with safety and with approximately equal success as is obtained by specialists, and this is undoubtedly true of the use of Dr. von Ruck's preparations, which are the only ones with which I am practically familiar.

The watery extract which I employed prior to the introduction of his vaccine has produced equally good results, and some of my most gratifying successes in the advanced cases of phthisis were obtained with

it. The vaccine appears, however, to me to be a more powerful immunizing agent, and in early-stage cases especially the improvement observed by me appeared more rapid and an apparent recovery was effected in considerably shorter time.

The methods of preparing the watery extract of tubercle bacilli and that for the preparation of the vaccine against tuberculosis were given in their respective announcements.

The formula for the watery extract of tubercle bacilli is given in a paper read before the American Climatological Association, which appeared in its Transactions for 1897, and also in the THERAPEUTIC GAZETTE of the same year, page 388.

The preparation of the vaccine is given in a report from the von Ruck Research Laboratory, June 1, 1912, and in vol. 82, 1912, p. 369, of the *Medical Record*. Sufficient details are supplied in either case to enable any well-equipped laboratory to manufacture an identical preparation.

The watery extract represents a solution of extractives from tubercle bacilli in water after the previous extraction of their lipoids with ether and alcohol.

The vaccine is represented by all body extractives and in definite proportion of the several proteids, albumin, and lipoids. It is so balanced that the most important immunizing body substances of the bacilli are present in larger amounts, whereas the lipoids are reduced sufficiently to remove the danger of local necrosis at the site of subcutaneous injection.

The advantages of the vaccine are considered to depend upon the presence of all the immunizing body substances of tubercle bacilli in solution without chemical or physical injury in the course of their extraction, and in such proportions that much larger doses can be administered than of a tubercle bacillus emulsion. Being a solution of the bacillary body substances, its action is certain and uniform and occurs with a promptness sufficient to insure a complete bacteriolytic immunity within a few days after the administration of a single full dose for the respective age of the individual, features which the authors consider especially essential for prophylactic vaccination in order that the latter shall be practical, reliable, and simple, the same as is vaccination against smallpox or typhoid fever.

In order to prevent self-treatment and the use of the preparation by incompetent persons, they are not supplied to the trade and must be ordered directly from the laboratory by physicians.

The technique of administering the watery extract of tubercle bacilli and the vaccine for the treatment of tuberculosis is the same. Physicians receive with their first order general directions in regard to dosage and the selection of the cases; and I have found the Drs. von Ruck extremely courteous and ready to consider and answer by letter any questions that may arise, with the view of aiding those less experienced in successfully treating their tuberculous patients at home.

Inasmuch as the degree of spontaneously acquired immunity in tuberculous patients varies, the degree of sensitiveness and liability to reaction does so likewise. To prevent severe reactions the beginning dose should be minimal, and is from 0.05 to 0.1 Cc. of the full strength of the remedy. On request a 10-per-cent solution of both preparations is supplied by the laboratory, and directions are given for their preparation, which is simple and requires the use of boiled water containing 0.5 per cent carbolic acid in proportion to one part of the remedy and nine parts of the water.

Injections are made subcutaneously, and the locality must be changed frequently in order to prevent the neutralization of the dose by the occurrence of a local immunity greater than that of the blood and of distant tissues.

The increase of doses depends upon the observed general and focal reactions; so long as these occur no increase is permissible, and if severe the dose should be reduced. The interval between doses is five days providing no reactions follow or when observed if the symptoms and signs disappear within forty-eight hours after administration. The subsequent increase of doses has for its object the continuance

of periodical specific stimulation of tuberculous lesions and the increase of the general immunity. For the size of subsequent doses, individualization is necessary. As a rule, and especially in the early part of treatment, an increase of 0.1 Cc. is sufficient. There is no maximal dose, but it is not often necessary to exceed 1 Cc., especially if the site of the injection is varied. Intravenous administration is recommended when reactions to 1 Cc. fail; the intravenous dose should not exceed one-fourth of the dose which failed to cause reaction.

For prophylactic administration in instances of clinically non-tuberculous persons, and such who have been exposed to infection who are free from fever, and in good nutrition, a single maximal dose may be given, which in size varies according to age and weight. For children up to one year of age the dose is 0.1 Cc.; for adults weighing in the neighborhood of 150 pounds it is 1 Cc. In cases which present evidence of tuberculosis the procedure to be followed is the same as outlined above for treatment.

PRACTICAL USE OF DEAD CULTURES OR VACCINES.

BY LEO BERND. M.D., PHILADELPHIA.

So much theory has been written about the use of dead cultures or vaccines that the practical side has been overlooked.

While most of the writer's work has been urethritic, he has had some interesting results in other cases.

Several years ago, in a case of nasopharyngeal catarrh which persisted in spite of the specialists, a mixture of the different organisms found, in about four injections, practically cured the patient. Since then a number of the author's friends have been injected as a prophylactic measure, and none of them has had grippe or colds to any extent. The mixture used contained pneumococci, staphylococci, streptococci, catarrhalis, and all others found in the sputum.

One case of pneumonia, on a large dose of pneumo-, strepto-, and staphylococcic injection, within three days was practically well. On Saturday the temperature was 105° F., complete consolidation on the right side, with pneumococci in the sputum. The patient's temperature came down by lysis, and the patient was home in one week with no bad results. Another pneumonia case acted the same way.

In furunculosis and acne the results have been wonderful.

In acne the results are slow. There is no remarkable change at once, but after a month or two the patient suddenly realizes that there are no more lesions appearing.

The author prefers cultures from the individual. Stock (acne) preparations have given some results, but the autogenous are the better.

The staphylococcic cultures seem to work just as well pure as when mixed with the so-called acne bacillus. In one acne case mixed staphylococcic and diphtheroid organisms were used.

In rheumatic cases the mixture of pneumococci and streptococci has given good results.

In the surgical dispensary of the outdepartment of the Woman's Medical College all pus cases are given staphylococcic mixtures. It is remarkable to see how quickly they sometimes recover without operation, especially when the glands of the neck and axilla are affected.

An orchitis, with no visible urethral discharge, responded to gonococcic cultures, and in two injections was nearly well.

In several burn cases, when there seemed to be a tendency to general infection, streptococcic vaccine injected stopped the process immediately. This idea was evolved from the fact that quite a number of children developed scarlet fever after severe burns.

The uniformly good results have only followed large doses of the bacteria.

In gonorrhea the initial dose is never less than 20 billions; in staphylococcic injec-

tions at least 10 billion, and in acne the same.

The nasopharyngeal cases have required at least four and sometimes six injections, at intervals of four to five days, increasing the doses.

Drain cases of appendicitis, with fistula, heal more rapidly when given dead cultures containing the organisms found in the pus.

Following the injection, the patient in about three to five hours has a feeling of malaise, probably a chill, and usually within twenty-four hours is all right. There is a feeling of fulness and sometimes pain over the kidneys, as though the capsules were tight, due to swelling. The urine is cloudy sometimes, with albumin. All this clears up in twenty-four to forty-eight hours.[1] This is more noticeable in cases in which stock vaccine has been used—probably due to the trikresol used as a preservative. It seldom occurs in the unpreserved cultures.

SOME SURGICAL PROBLEMS OF TO-DAY.[2]

BY J. E. SWEET, A.M., M.D., F.A.C.S.,
Professor of Experimental Surgery in the Medical Department of the University of Pennsylvania.

An invitation to come from Philadelphia to Boston carries with it a great honor and a great responsibility. It is not difficult to appreciate the honor; it is difficult to live up to that honor—it is difficult to merit the responsibility.

I have chosen as the subject of my talk "Some Surgical Problems of To-day" because it seemed that if I were to venture to carry coals to Newcastle, these coals must have come from some different sort of mine than the one from which you in Boston have already mined such a vast tonnage. The only thing I am doing which is in any way different from what you are doing, is that I am spending my entire time in the study and teaching of surgical problems. This gives me a peculiar advantage perhaps in being so placed that I am in close touch with both the laboratory and the clinic, yet not so close that I feel that I belong to either group alone.

Therefore it seemed that anything I might find to interest you must be sought in this field, and might best consist in a simple exposition of what we are doing and are trying to do in the department of surgical research of the University of Pennsylvania.

I shall necessarily often use the personal pronoun or the editorial "we." I regret that this must needs be so, for I would rather talk of you and of Boston and of Boston's hospitality, but I do not suppose you invited me to come and talk of what you know better than I.

The department was started when we had a surgeon as dean, Dr. Frazier. It has now won the support of our present dean, Dr. Pepper, an internist. Perhaps this alone gives you an idea of the measure of our success, that a department started by a surgeon should succeed in convincing an internist. The idea behind the starting of such a department was that there is much room for a department of surgical research, as much need for research in surgery as there is for similar work in the department of medicine.

While it is true that there is no subdivision of medical problems, that the problems of surgery are the problems of medicine, that both are the problems of pathology, itself a branch of physiology—all problems of biology—it still remains that many problems are peculiar to surgery, and that many more there are in which the skill of the surgeon is necessary to their solution.

There is another phase of the possible usefulness of such a department. The deliberate cultivation in the student's mind of that spirit of doubt, of inquiry, of search for truth which characterizes the student

[1] The doses used by the writer of this paper are larger than customary, and this probably accounts for the severe symptoms following their use.—Ed.

[2] Read before the Norfolk District Medical Society of Boston, January 30, 1917.

of the laboratory, which marks by its absence the empiric practitioner—this attitude of mind is not seen often enough in the surgeon. Therefore a laboratory which can instil into the surgical mind this point of view, by showing the student of surgery wherein he may profit by it in his own chosen field, will fulfil its broadest mission.

The work of such a department will therefore fall under two headings: the teaching of the student of surgery, and the research work of the department—the attempt by applying any branch of knowledge to surgery to solve the problems of surgery.

The common conception of any department of surgical research as a teaching department for undergraduate students is that of a place for teaching surgical technique by actual practice on the living animal. There can be no doubt that such experience is of enormous value. The art of surgery is a mechanical art, and practice is necessary to the perfection of mechanical technique. As in watch-making the apprentice is not set to work upon the finest specimens of the watch-builder's art, but upon the alarm clocks; so in surgery it does not seem right, to the surgeon at least, that the apprentice should learn first principles upon the most perfect specimen of nature, man. Another very important feature of this phase of the work is the training in the power of observation. A student can better understand the clinical work if he has an idea from personal experience of the difficulties being encountered by the surgeon, of just what the surgeon is trying to do.

This is undoubtedly an important feature of the work, but it does not in our opinion represent the highest utilization of the facilities of such a department. Too often the need for technical skill is so emphasized in surgery that the student never sees beyond. Too often the surgeon merits the reproach of being only a carpenter. Too rarely does he combine the skill of the worker in wood with the imagination of the architect. What we need in surgery is not more men so skilled that they can operate without thinking, but more surgeons so trained that they can think and therefore perhaps not operate at all.

The teaching work of the department consists in giving a good deal to a few students, rather than in giving less to a good many. The course is not a required course for the reason that only a small proportion of any given class should be encouraged to enter surgery. Therefore it is an elective course, further limited by the resources of the department to twelve men chosen from those of the third-year class who have elected the course. Thirty-seven elected the course this year; twelve were chosen. These twelve men start upon some standard operation, one acting as surgeon, one as assistant, one as anesthetist, each taking turns until they have mastered the rudimentary details. Then each group of three starts upon some surgical problem, working one period each week throughout the third year, and without exception they are sufficiently interested to continue the work throughout the greater part of the fourth year, giving up one evening each week for the purpose.

What are the problems upon which they are engaged? At the present moment four groups of fourth-year men and four groups of third-year men are working out specified problems. You will gain the best idea of what they are doing from a description of their problems.

One group of fourth-year men is working at the question of the relation of the adrenals to gastric ulcer. You will recall that recent publications have discussed this subject, and it is certain that definite ulcers do appear after double adrenalectomy. The explanation of these ulcers is not clear, nor is the bearing of these observations upon the problem of the etiology of gastric and duodenal ulcers in the human being. A second group is studying the methods for treating a pyloric stenosis; a third group is busy on the question of peritoneal adhesions; a fourth with some problems concerning the thoracic duct.

The character of this work you may soon judge for yourselves. The four papers representing the work done by the

four groups of the class of 1916 are soon to appear in *Surgery, Gynecology and Obstetrics.*

The third-year men are just starting, the one group on the possible reconstruction or reformation of the gall-bladder from the stump of the cystic duct. Several instances are on record of the reformation of the gall-bladder after cholecystectomy. Naturally this work will have some bearing upon cholecystectomy versus cholecystotomy. A second group is studying the relation of the lymphatic system of the gall-bladder to intraperitoneal infection. A third group is experimenting on the relation between thyroid and adrenals, and the fourth is quite busy with a problem in anaphylaxis.

Now many of you are wondering what much of this has to do with surgery. My answer is that it depends entirely upon your concept of surgery. If the surgeon is only the carpenter, the internist the architect, if surgery is only technique, not diagnosis, if the diagnosis of surgical conditions does not require that same insight into the finest workings of the human machine as does the diagnosis of medical conditions, then it has nothing to do with surgery. Our concept of surgery is that the real surgeon must know as much as any man in any branch of medicine, and having learned that he has still to learn the whole field of surgical technique.

For instance, why should a group of students be working at anaphylaxis in a surgical department? Does not this subject belong to the internist and the serologist? Perhaps it does generally, but the occurrence of gastric ulcers after adrenalectomy, the occurrence of ulcers after diphtheria intoxication, and the occurrence of ulcers after anaphylactic shock bring the simple surgical problem of the etiology of gastric and duodenal ulcer to a point where to understand the possibilities one must go into the subject of anaphylaxis. The surgical technique connected with a problem involving thyroidectomy, with preservation of the parathyroids and adrenalectomy, is quite sufficient for the pure technician. It also requires a study of the function of the thyroid and the adrenals, which will prepare the student for an understanding of the present trend in the study of the toxic goitres.

Again the question, is not the greatest surgical problem of the day how we shall make ourselves better surgeons, how we shall train better surgeons; do we want more men so skilled that they can operate without thinking, or more men so trained that they can think without operating?

The research work of such a department falls under two headings: Work done for other departments, in which other branches make use of the technical skill of the department, and in return offer their facilities for the study of purely surgical problems, and the specific research work of the department itself. This coöperation with other departments is one of the most gratifying and important developments of our work. As in any other modern plant, thorough coöperation between various organizations is necessary. So we have done many and varied operations—hypophysectomies, thyroidectomies, gastrectomies, pancreatectomies, various blood-vessel anastomoses, etc.—for the physiological chemist and for the workers in research medicine. The research work of the department, the study of surgical problems, I will attempt to illustrate to you by a discussion of our results along several lines, using lantern slides wherever possible to make my meaning more clear.

Five years ago we were interested in the problem of the pituitary. Following out our ideas of coöperation, we associated ourselves with a neurologist, Dr. A. R. Allen. At that time a problem of considerable interest to us was whether the gland was essential to life or not, a question that is perhaps not yet clearly solved. The point seemed rather essential, for if the gland is necessary to existence, the surgeon should know the limit of safety in its partial extirpation. At that time we reported the results in 22 dogs, of which series five lived for months and one lived until the last two weeks, when he died of distemper pneumonia. Since that time we have operated

on many more dogs for many different reasons with a much better operative record. In none of the dogs operated upon have we ever noticed any important symptoms referable to the operation, no peculiar gait or position, no tremors nor other clinical symptom. Recovery was prompt and without complications.

The technique of operation is as follows: An incision about two inches in length is made in a perpendicular line over the center of the zygoma, the zygoma forming, as it were, a base line with the two-inch incision extending in a perpendicular to such a base. The zygomatic arch is removed, the coronoid process of the mandible resected, and the base of the skull thus approached in a direct line. The skull is trephined and the hole somewhat enlarged downward, and after opening the dura, which is firmly attached to the base of the skull, the brain is carefully elevated by a suitable retractor. The hypophysis is then removed by a special loop forceps, the entire gland being generally removed in one piece. The wound is closed without drainage. With a strong light—in my own work I find it is necessary to use direct sunlight reflected from a heliostat to a mirror—no particular difficulty is encountered. Without this light I have been unable to accomplish anything. This approach, which has been used before, was chosen because the Paulesco-Cushing incision, with its extensive removal of the skull, seems unnecessary, since in our opinion the movability of the base of the brain is determined by the length of the arterial connection between the internal carotid and the circle of Willis rather than by the extent to which the brain may be lifted out of a large opening in the skull.

The first change which we have noted in the animal following this removal of the pituitary is an indeterminate effect upon the pancreas. In all the animals in which we have regularly made note of the pancreas, it is recorded that the organ presented a striking coloration, having the appearance of the gland seen at the height of digestion. Ordinarily at autopsy the pancreas presents the picture of a pale, even white, organ, the lobules at the edge being rather hard to differentiate from the neighboring fat tissue. Microscopically, these changes apparently consist only in a marked congestion, and are perhaps identical with those to be found in the pancreas at the height of digestion.

We have, in collaboration with Dr. Ringer, formerly of the department of physiological chemistry, endeavored to work out more definitely this relation between the hypophysis and the pancreas. It is known that if the greater part of the pancreas be removed, leaving for example the small island of tissue which in the dog is drained by the duct corresponding to the duct of Wirsung in the human subject—that is, leaving about one-twelfth of the pancreas in its normal position and completely removing the rest—the animal can thereby be brought to a very exact threshold of sugar tolerance. Thus I recall one animal in which following such an operation thirty grammes of protein given by mouth was completely burned, while the feeding of forty grammes resulted in the appearance of glucose in the urine. Now it seemed that if from such an animal whose glucose metabolism is on the very edge of the threshold of tolerance, the hypophysis were also removed, one should be able to demonstrate the clinical fact that the human hypophysis does seem to have some influence in the control of sugar metabolism. But our studies on a sufficient series of animals gave us no result whatever. We do not therefore conclude by any means that the clinical observation is wrong.

The second finding after hypophysectomy, which has been almost constant, is the pronounced atrophy of the testicles. This atrophy involves only the spermatogenetic tissue of the organ and is complete where it occurs in a very short time. One specimen removed ten days after hypophysectomy, another after fifteen days, show this very complete loss of this one group of cells. The interstitial cells are apparently normal. The third finding is the enormous increase in adipose tissue. The animal whose picture I have shown you doubled his weight.

Five years ago we reported that in three dogs autopsied and studied after several months' time the thyroid presented a change, the significance of which we could not interpret. There is an evident increase in the amount of colloid with a flattening of the cells lining the alveoli.

Now this dog, whose picture I have shown you, died within the last two weeks of an intercurrent distemper pneumonia, having lived to all appearances in perfectly normal condition, except for the enormous deposition of fat, for almost five years after the operation upon the hypophysis.

Dog at left four years after the removal of the hypophysis. Compare the fold of fat on the abdomen with the clinical pictures of the obesity of hypophysis disturbance.

The autopsy of this animal has revealed some very interesting conditions. There was no macroscopic evidence of any pituitary tissue. The entire base of the brain is being sectioned for microscopic study. The pineal seemed normal. The thyroid lobes had apparently entirely disappeared, the thyroid being represented by a thin lobule, corresponding to the human isthmus. The dog's thyroid ordinarily has no isthmus. The thymus was persistent and large, weighing 23 grammes. Heart, liver, spleen, and kidneys showed no gross changes except an abnormal amount of fat. The adrenals are grossly normal, possibly somewhat smaller than normally. The testes show pronounced atrophy. The lungs show the evidence of distemper pneumonia.

In spite of the apparent degeneration of the thyroid, I am not prepared to say that this animal showed any symptoms of myxedema. At any rate the condition of the dog's hair was unusually good, and I have noticed in other animals what seems to be an unusually rapid growth of hair and an unusual fineness of texture of the hair.

This operation of hypophysectomy has also been used following out our ideas of coöperation for a study of the so-called Abderhalden reaction. You will probably wonder what this has to do with surgery. The reaction, as you know, depends upon the fact that the serum of certain patients, such, for example, as the serum of a pregnant woman, when incubated from a substrate made from tissue, as for example in pregnancy placenta tissue, incubation being carried out in a dialyzing bag, causes some substance to appear in the dialyzate, which reacts with the substance known as ninhydrin; this reaction has been suggested as a means of diagnosis of malignant tumors, which I think you will agree is a rather important surgical matter. My associate in the Oncologic Hospital in Philadelphia, where I am engaged in an advisory capacity, Dr. Saxon, has devised an improvement in the technique of the reaction, and we have been using these hypophysectomized animals to test out this Abderhalden reaction. Without entering here into a discussion of the Abderhalden reaction, its value in pregnancy or whether it has anything to do with the amino-acids or with tissue ferments, let me say only this, that these dogs give consistently a positive reaction to testis if they are males, a positive reaction to ovary if females, that the males do not react to ovaries nor the females to testis, and that some three years ago this dog whose picture I have shown you, which lately died, gave constantly a positive reaction to testis and to thyroid.

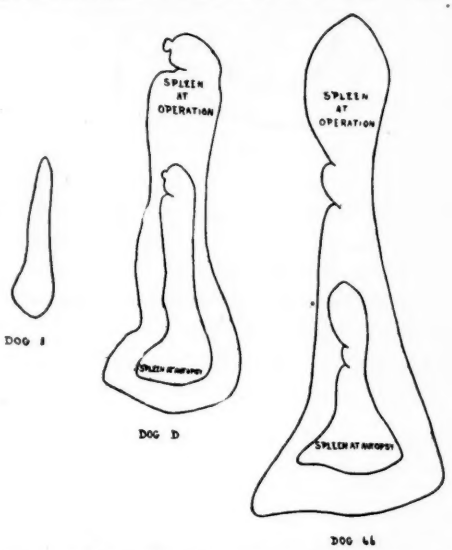
I do not know the meaning of these things I have found. We are all working at a building, bricklayers working under the direction of a master, each building his part brick by brick, not even knowing the purpose or design of the building as a whole. I do not feel inclined yet to attempt to form an idea of the whole build-

ing. He who lays down his trowel and climbs down from the scaffold to walk back and see the structure as an entity, only succeeds in stopping his own adding to the structure. Some day the Master will permit us to see, when we are laying the top courses, what it is all for.

These findings in the hypophysectomized dogs of some relation between hypophysis, pancreas, and thyroid, suggest another problem, the relation between pancreas, spleen, and thyroid. Our work on this problem came from a statement made by our professor of physiological chemistry, Dr. A. E. Taylor, that since the digestive ferments are represented at so many different places along the alimentary canal, the loss of any given series of ferments would be compensated from some other source, Therefore the digestive function of the pancreas could be dispensed with. I did not believe this statement and made a few experiments, discovering first that the physiological chemist was correct, learning anew that it does not pay to doubt. The external function of the pancreas was removed either by cutting the two ducts between two ligatures and interposing omentum to prevent their reformation, or by the entire removal of the duct-bearing area of the pancreas. Such an animal will lose weight down to a certain point, and will then hold its own in apparent good health. One such animal was allowed to live for ten months. At autopsy the most striking feature observed was the very extensive atrophy of the spleen. After this the spleen was measured at operation and again at autopsy. These pictures show the results. This central picture shows the effect upon the spleen of an acute pancreatitis, this degree of atrophy having been found three days after an operation upon the pancreas which resulted in an acute pancreatitis. This observation suggests a possible explanation for the report published by the late Dr. Musser of the recurrence of acute anemia in a number of cases of acute pancreatitis.

The second finding of note in these animals was the condition of the thyroid, which shows gross changes consisting in an apparent increase of colloid, with the result that the gland becomes translucent and even actually transparent. Chemical studies show a great increase in the amount of iodine in such glands.

I have introduced these results here, even though they are perhaps in no sense surgical, to bring out a point in the problem of the ductless glands, which I believe will some day assume practical importance. Whatever these glands are doing, it is certain that they must obtain a mother substance for the manufacture of their specific products from some source or other. This



Outline drawings of the spleen before and after the complete removal of the external function of the pancreas.

mother substance can only be obtained from one of two possible sources. It is either a product of anabolism or catabolism, and in either event must come in the last analysis either directly or through the mediation of some other gland from the food taken into the body. Therefore, and this I feel may become a point of practical importance, it may become possible to control the function of the ductless glands by controlling the food supply of the body, just as in the experiments I had cited the spleen and thyroid are changed after the removal of the great digestive function of the body. This is not necessarily a new idea—we use

it clinically, for instance, in the treatment of toxic goitre; but I feel sure that more study along this particular line would result in information of great value. It seems to be thoroughly established, for instance, that beriberi is due to a lack of certain food elements. It is not impossible that the same

FIG. 1.

disease picture could be produced by the inability of the body to absorb or utilize these specific substances even though they were present in the food.

I would not be surprised to find that the cancer problem lies right here. Given a group of cells removed from the influence of those factors which control cell growth,

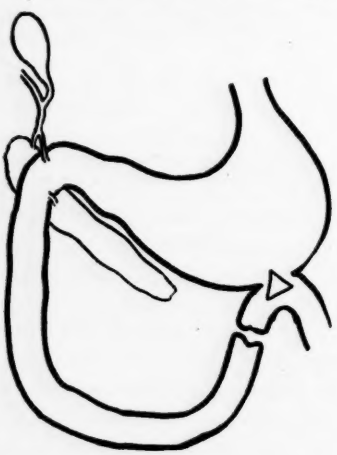


FIG. 2.

that influence which says a kidney for example shall grow so large but no larger, and given an excess of the food elements needed for the growth of cells, why should we not have a cancer? The hypertrophy of acromegaly is essentially a tumor growth only with the cells still held in their normal relation. At any rate our work at the Oncologic Hospital has shown conclusively that experimental tumors will not grow in animals fed on a diet which fails to furnish those food factors necessary for body growth, and on the other hand there are certain substances, notably cholesterol, which greatly stimulate tumor growth in experimental animals even to the point of causing very extensive metastases with a tumor which normally does not metastasize.

These are theories, idle theories perhaps, but if you would make much progress along any line, experimental or clinical, you must suppose something and then see if your

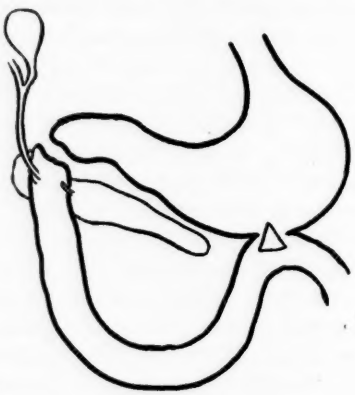


FIG. 3.

facts fit the supposition. He who refuses to suppose anything until it is proven will have to wait for some one else to prove it.

Another problem which has engaged the attention of the department again in coöperation with the department of physiological chemistry, this time with Dr. Byron Hendrix, is the problem of high intestinal obstruction.

The problem of the cause of death in either the mechanical or functional, *i.e.*, paralytic, obstructions of the upper bowel is not a new problem of surgery. Many explanations have been offered, practically each worker offering a new theory to account for the clinical fact that such disturbances of the normal physiology of the upper bowel are marked by the clinical picture of a grave constitutional disturbance of a

manifest toxic nature. Among these theories, for example, were that the picture is due to central nervous disturbance, to peripheral nervous disturbance—*i.e.*, splanchnic paralysis—to bacterial invasion, to a loss of a necessary function of the parts involved, to the formation of peculiar poisons, to dehydration by vomiting and diarrhea, etc.

The problem was made more concrete by the work of Draper. Draper was experimenting with a twine triangular stitch which was to take the place of the elastic ligature devised by McGraw for performing a gastroenterostomy and was confronted with the difficulty that all his animals operated as in Fig. 1 died before seventy-two hours, the time which he found to be

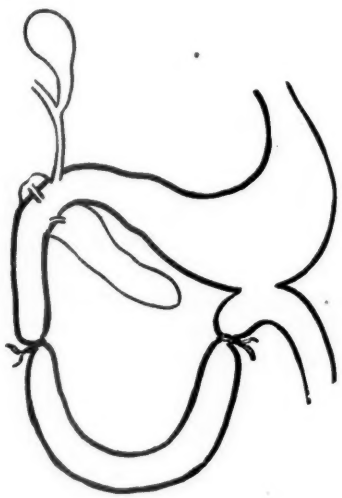


FIG. 4.

necessary for the twine stitch to cut a stoma between stomach and bowel. On the other hand, animals operated as in Fig. 2 lived, and animals operated as in Fig. 3 lived as well. In other words, animals lived in which a blind end of the duodenum longer than 35 cm. from the pylorus was made, while if the blind end was less than 35 cm. in length measured from the pylorus, the animals died. In the first 35 cm. of the duodenum some changes therefore take place under the conditions of obstruction which cause the death of the animal. Draper's further attempts at solving the problem were directed along the line of his idea that the toxin is a normal product of the duodenum, which under normal conditions is neutralized or detoxified by the jejunum. As we shall see, his idea may not be so far from the truth, although his

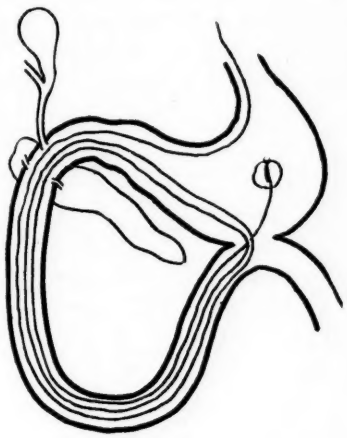


FIG. 5.

attempts to prove his point have not been convincing.

Whipple, Stone and Bernheim, of Baltimore, approached the subject by a slight modification of Draper's method. To an ordinary gastroenterostomy is added a double ligation of the gut at the points shown

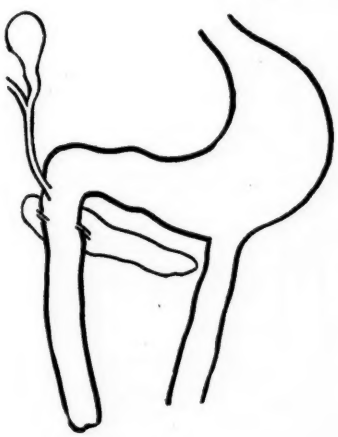


FIG. 6.

(Fig. 4). On the death of the animal this isolated loop is found to contain a powerful poison, which, free from bacteria, on injection into a normal animal will cause its death with the typical symptoms of high

obstruction. This finding would seem to rule out all the other theories which do not include the action of a definite poison.

The first point which interested us concerns the question, of general surgical interest, Does a gastroenterostomy opening really function in the presence of a normal pylorus? In spite of the work of Kelling and of Cannon, who by their *x*-ray studies

FIG. 7.

concluded that such an opening does not function in the presence of a normal pylorus; in spite of the work of Draper, who reported the experiment shown in Fig. 5, in which a string attached to a bolus of food

FIG. 8.

shows at autopsy that it has followed the normal course of the food, there was two or three years ago but a small number of surgeons who believed that the food followed its normal course. Whipple, Stone and Bernheim seemed to take for granted that the gastroenterostomy opening drains the stomach and upper gut, above their first ligature. It was, however, in our opinion a question whether they were not really studying a condition of functional obstruction of the upper duodenum as well as an actually obstructed portion. If such were the case, their finding of a toxin within this loop would not necessarily mean that it had been formed there; it might just as well have been formed in the functionally obstructed portion and excreted into their closed loop. The fact that they found no toxin in a closed loop, the mucosa of which had been destroyed by sodium fluoride,

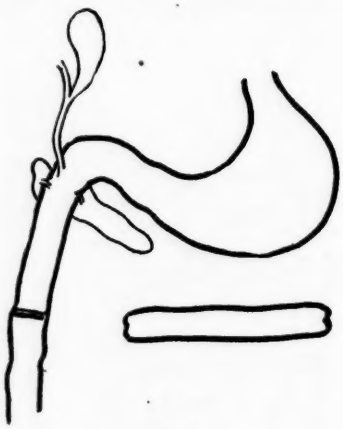


FIG. 9.

would not add further proof, for the destruction of the mucosa would destroy both possibility of formation in the loop and the possibility of excretion into the loop. We therefore tried the experiment shown in Fig. 6. If this operation be done on a series of animals, doing either the end-to-side pictured, or the ordinary lateral gastroenterostomy, it will be found that some of the animals will die with all the symptoms of high obstruction; and in those that live, either an enormous dilatation of the duodenum, as shown in Fig. 7, will be found at autopsy, or perhaps less dilatation but striking hypertrophy of the muscular layers of this segment of the duodenum.

It is only this functional obstruction of this first segment of the gut, in Whipple,

Stone and Bernheim's experiments, it seemed to us, which could explain the finding which they report after the operation shown in Fig. 8. They report that death follows, even though the isolated loop be drained to the exterior, and even though it be washed out freely.

We then followed the technique shown in Fig. 9, by which, instead of doing the gastroenterostomy with its functional obstruction, we isolated the same area of the duodenum as did they, but restored the continuity of the tract by an end-to-end suture, and we found that we could drain the loop at either end, and the animal remained perfectly well. We have had several instances in which the animal has lived for weeks with this loop closed at both ends; we have had many instances in which the animal lived for a week or ten days; we have drained into the bowel below by doing an end-to-side to a point of the bowel lower down, and nothing happens. We find that such loops, entirely closed, tend to become enormously distended with fluid, and our present opinion is that it is only because of such distention and consequent rupture that our animals with closed loops die.

Now if a loop of the lower ileum be closed off, the continuity of the tract being restored by an end-to-end around the loop, it will be found that the animal will survive for long periods. This was shown by Halsted years ago. We have found that if we make such a low loop, and fill it with pancreatic juice, or with a fresh dog's pancreas, the animal may die in the time limit, and with the symptoms characteristic of high obstruction. But this experiment is not conclusive of the rôle of the pancreas or its ferments in the production of the poison in question, for we may have added only the necessary pabulum for the intestinal bacteria. Let us look for a moment at the chart Fig. 10, which shows the toxic products of proteid digestion. Highly toxic properties have been found in the proteose stage of protein digestion. The normal ferments of the stomach and the normal ferments of the pancreas can, of course, break a protein down to this stage; normally it is supposed that the gastric digestion carries the proteins of the food to the peptone stage, from which the digestion is carried to the amino-acid stage by the ferments of the pancreas and the intestine. The intestinal juice is not supposed to contain any proteolytic ferment except the ferment erepsin, which can digest the protein casein, but no others, while its chief function is to digest the proteoses to the amino-acids. But either gastric or pancreatic ferment is capable of producing a toxic proteose. In addition, many bacteria can digest the protein building-stones to the highly toxic amine compounds. Further, the substance lecithin can, by the action of the fat-splitting ferment lipase, be broken down with the formation of the choline bases, some of which, such as choline and neurine, are highly toxic.

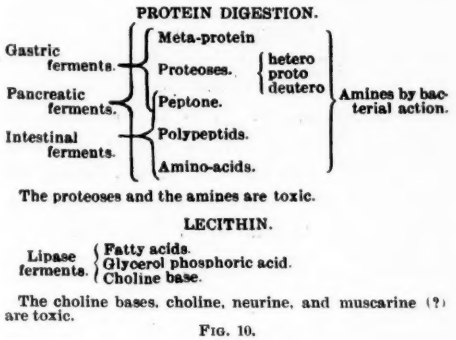


FIG. 10.

Whipple and his associates have recently published a work which proves that the toxic body found in their high loops is a proteose, and they have further shown that this purified proteose will exactly reproduce the symptoms of high obstruction when injected into a normal animal.

Now Whipple's contention that the toxin involved is a proteose makes it still more difficult to understand his previous ideas that this toxin is formed in the intestinal loop, or by the mucosa of the intestinal loop. For the formation of a proteose a proteolytic ferment is essential, and the mucosa is not supposed to contain any proteolytic ferment except the ferment erepsin, which is supposed to break down, not form, the proteoses. We have found this so-

called proteose in our own loops in animals operated as in Fig. 9, and, nevertheless, we are not prepared to admit that this toxin can be formed without the assistance of a proteolytic ferment.

We are inclined to rule out the gastric digestion because of the experiment shown in Fig. 11. In animals in which, a long time previous, the ducts of the pancreas have been tied, so that for a long period no pancreatic ferments have been entering the intestine, an absolute high obstruction, without the formation of any loops, was produced. Three such animals have lived

FIG. 11.

for seven and eight days, instead of the two to three days a normal animal will live with such an obstruction. Further, we have obtained a toxic material from loops of intestine in such animals which had no external secretion of their pancreas, but it was not a proteose. From the symptoms produced it would seem that this poison belonged in the class of the choline bases. The intestinal juice, while it contains no proteolytic ferment capable of producing a proteose, does contain a lipase. An animal in which the operation shown in Fig. 11 has been done should have the products of gastric digestion, which products might contain a proteose, but the fact that they do not die with the symptoms of high obstruction leads us to rule out the stomach.

Two findings in the course of this work have, therefore, interested us surgically. First, the added demonstration of the fact that a gastroenterostomy opening does not function in the presence of a normal pylorus. The second, the explanation of the similarity between acute pancreatitis and acute high obstruction—they are alike because they are both essentially the same thing, an intoxication with the toxic products of protein cleavage, in pancreatitis certainly due to the proteolytic ferment of the pancreas, in high obstruction not necessarily perhaps, but in our opinion in all probability, the same toxin, produced by a similar ferment. In pancreatitis the escape of the products of the digestion of the pancreas into the tissues permits the intoxication; in obstruction the conditions of obstruction permit the absorption of toxic products, which under normal conditions would either not be formed, or if formed would be immediately broken down to non-toxic products.

You will notice that the work on high obstruction has largely centered around the mechanical or purely surgical side: the effort to find out why this particular portion of upper duodenum is involved. Our own work at the present moment tends to lead the problem quite away from the purely mechanical point of view. We have found, for instance, that the intestinal content of an animal, after the removal of the adrenals, contains what is apparently the same poison, no obstruction being present in the intestines, simply double adrenalectomy. Further, the poison can be isolated in sufficient amount to kill a normal dog from the intestinal content of a normal dog killed by an intravenous injection of a minimum fatal dose of poison prepared from a loop, and this can be continued on through several dogs. Indeed, as far as our experience goes, it would seem that this process could be continued indefinitely if we possessed a sufficient refinement of chemical technique for the isolation of the poisonous substance.

It would seem from these observations, therefore, that the same or a similar toxin

can be formed in the intestine or found in the intestine under other conditions than those of actual obstruction, and that on intravenous injection of the sterile poison it reproduces itself in the intestine or reproduces the conditions under which it was originally formed. It would seem further that these observations rule out bacterial infection as a factor in the production of the poison, for the finding of a fatal dose of poison in the intestine three or four hours after the intravenous injection of the sterile toxin makes it seem very unlikely that bacteria can have produced it, and the relation of adrenalectomy makes it seem further highly probable that we are dealing with some perversion of some natural process, just as in acute pancreatitis we are evidently dealing with a perversion or dislocation of a natural process.

Many of you are no doubt wondering what actual practical value this sort of work has. Many of you will not in your hearts agree with me that my standard of surgery is a possible standard for the man who has to earn his living by the actual practice of surgery. Many of you no doubt would ably argue the point whether we should attempt to teach students the ideal or the practical; that since four years is a short period, and most graduates in medicine go out to practice and must know what to do when the occasion arises, therefore we should teach them what to do rather than the theory of why to do it.

Now there are certain eminently practical points to be learned from these purely experimental studies. The first point I would bring out of this relates to the treatment of high obstruction. It has been shown experimentally that animals with high obstruction can be kept alive for periods of time far in excess of the normal time such an animal will live, by the introduction into the body subcutaneously or intravenously of large amounts of saline solution. Therefore in the treatment of cases of high obstruction intravenous saline should be used freely. The second point concerns the treatment of the obstructed gut itself. There seems to be some question in the minds of practical surgeons as to whether they should content themselves at operation with simply freeing the obstruction and allowing the content of the obstructed portion of intestine to pass along down the normal channel, or whether it should be removed by opening the intestine. The demonstration of the presence in this fluid of obstruction of a poison so potent that a relatively small dose, comparable in its toxicity to that of strychnia, quickly kills a normal dog, would seem to clearly answer this point. The toxic fluid should be removed from the body. In fact it seems strange that surgeons should even raise this question, since they all know that one of the most effective clinical procedures in the treatment of high obstruction is the free use of the stomach-pump, and the removal thereby from the stomach of the products resulting from obstruction.

The second practical point I would bring out relates to a problem which I have not discussed as yet, the transfusion of blood. In the earlier history of the operation for transfusion I find that it was recommended to inject blood directly into the peritoneal cavity. One can find records of some thirty-seven cases thus treated, with apparently as good results as are found in the modern reports of transfusion operations. We became interested in the question of what becomes of the blood or blood-stained fluid so frequently left behind after operations in the peritoneal cavity, and which, if an autopsy is done twenty-four hours later, is found to have entirely disappeared. We found that the older pathologists taught that blood cells are taken up from the peritoneal cavity and returned to the circulation; that the younger pathologists believe that these blood cells are removed from the peritoneal cavity by the same processes of hemolysis and phagocytosis which are seen after the introduction of alien blood. We found that those who had specifically worked with the problem had traced blood cells into the lymphatic apparatus of the diaphragm, and had then lost them in their further passage toward the circulation. We placed a cannula in the thoracic duct

and then injected defibrinated blood into the peritoneal cavity. We found that in about twenty minutes blood cells began to appear in the thoracic lymph, and gradually increased in number until the lymph assumed the physical characteristics of blood itself. Therefore we feel that the suggestion for reverting to the old idea of intraperitoneal transfusion possesses certain advantages for certain types of cases, namely, those in which the transfusion is to be done for its general effect rather than for its effect upon the low blood-pressure. The simplicity of the operation of drawing blood from a donor, defibrinating, and simply injecting defibrinated blood intraperitoneally, makes the method more fool-proof than any of the techniques for transfusion which have yet been devised. If hemolysis occurs in the peritoneal cavity, the slow absorption of the products of hemolysis would probably do far less harm than if the hemolysis occurred in the circulating blood. If a clot or two is injected it would certainly not produce embolism.

A third point of practical importance relates to the peculiar advantages possessed by such a department of work in that every operative case sooner or later comes to autopsy, and that the surgeon therefore not only autopsies his mistakes or his misfortunes, but what is much more to the point, autopsies his successes. If I could have it so, I would make every surgeon perform his most beloved operation upon a series of animals, and then after two or three weeks I would show him on the autopsy table that a perfect clinical result by no means proves a perfect surgical result. The most amazing lesson taught by experimental work is not what surgery can do to assist nature, but what nature does to assist, counteract, and overcome surgery. The crucible of the clinic does not compare with the crucible of the experimental laboratories. I repeat—a perfect clinical success does not necessarily mean a perfect surgery.

And finally, I still insist that the most important practical feature of the work of any department of research is the encouragement of the point of view, whether a man is to go on into the field of pure investigation or whether he engages in the most routine country practice. The attitude of mind which causes him to wonder why, to refuse to accept things as they are, simply because they are, will not only lead him to an appreciation of the value of books, but will give to him the satisfaction at the end of having lived a life with wide-open eyes. In your struggle to keep up with the progress of knowledge, does it ever occur to you to think of the other side—the things we do not know about medicine? Will medicine be the better when the time shall come when "your young men shall see visions, and your old men shall dream dreams?"

INFLUENCE OF FRESH BILE FEEDING UPON WHOLE BILE AND BILE PIGMENT SECRETION.

In the *American Journal of Physiology* of January 1, 1916, HOOPER and WHIPPLE state that feeding fresh bile to bile-fistula dogs causes an almost constant cholagogue action. Bile of the dog, sheep, and pig all have this effect, and ox bile seems to be the most active cholagogue.

Fresh bile feeding as a rule causes a fall in the output of bile pigments in spite of the cholagogue action. Pig bile as a rule is most active in this respect, and may depress the bile pigment curve to less than half normal. Ox and sheep bile may have the same effect. Dog bile often causes only a slight fall in bile pigment output, but may depress the curve to 50 per cent of normal.

Hooper's and Whipple's experiments exclude the possibility of bile pigment absorption from the intestine. There is no evidence to support the theory of "bile pigment circulation." These experiments give no support to Addis's theory of pigment conservation, urobilinogen absorption from the intestine and synthesis toward hemoglobin. It is suggested that urobilinogen may be formed in other body tissues rather than absorbed from the intestine.

Splenectomy does not influence any of the above reactions in bile fistula dogs.

EDITORIAL.

THE USE OF FOREIGN PROTEIN IN THE TREATMENT OF CHRONIC ARTHRITIS.

It has become increasingly evident as the years go by that only a comparatively small proportion of cases of so-called acute or chronic arthritis are really rheumatic in their nature. Certainly the great majority of the chronic cases are due to other causes—that is, to infections with different micro-organisms in different cases, or with a variety of organisms—and that the so-called micrococcus rheumaticus, which seems to be the factor in acute rheumatic fever, does not play as large a part as it was thought to play some years ago.

The readers of the GAZETTE will recall that some months ago we drew attention to several papers dealing with the effect of injected foreign protein substances in cases of acute and chronic arthritis, the most notable contribution being possibly that of Miller and Lusk. It will also be recalled that these investigators found that the injection of any foreign protein apparently resulted in such changes in the joints as to lead to benefit or cure in a certain proportion of cases, although, as a matter of fact, the protein which they used was typhoid vaccine, possibly because this was the most readily obtained vaccine which they had to hand. In their earlier communication they reported twenty-four cases to which they had administered this treatment. They have now reported an additional eighty-five cases with results that are certainly encouraging. In four cases of acute gonorrheal arthritis less benefit was derived from the treatment than in those cases due to other causes. They state that twenty-nine of the forty-five acute cases recovered promptly in the sense that pain, redness, and swelling disappeared in from one to five days, and usually within from twenty-four to forty-eight hours. Eight other cases showed great improvement with only some stiffness or slight pain. Six showed moderate improvement, and in two no benefit was obtained, even although they received as high as thirteen injections. In the subacute arthritic group in which the condition had existed for a maximum period of four months, twelve patients were treated, and in ten this cleared up in from three to five days on one to four injections. In the chronic type with acute exacerbations nine cases were treated, and in eight the acute infections cleared up promptly after from one to three injections. Nineteen patients, with chronic arthritis varying in duration from a few months to several years, also received these injections, and ten showed definite improvement after from one to five injections, the patient being able to move about with much greater facility. Five showed moderate improvement and four were not benefited. Unlike acute gonorrheal arthritis the chronic gonorrheal cases seemed to be benefited.

Of course, it is not to be expected that this treatment will materially modify endocardial complications.

The method of treatment carried out by Miller and Lusk was the intravenous injection of from 40 to 75 million dead typhoid bacilli, although some practitioners have used much larger numbers than these. Even these doses, however, when given intravenously cause a very marked rise in temperature, followed by a severe chill, with headache and nausea. Some suffered from dyspnea, and in some the reaction was so severe that treatment was discontinued after a single injection. They believe that a poor myocardium, or marked hypertension, is to be considered as a contraindication to this treatment.

The interesting question arises as to whether it is necessary, to produce curative effects, to give doses so large as to induce these associated manifestations. As we pointed out in the previous leading article on this subject, it would seem to be definitely true that the injection of various forms of foreign protein are advantageous in a certain proportion of cases. It was

also pointed out in the article, to which we have referred, that phylacogen affords a means of administering foreign protein in a convenient and serviceable manner with a minimum of danger, provided the doses are properly gauged. We have repeatedly used so-called rheumatic phylacogen with very notable success in relieving pain in acute arthritis, using it only hypodermically, and in many instances have gotten no reaction of note, and never a reaction which was sufficiently severe to make us think it unwise to repeat the dose, giving hypodermically 2 Cc. to start with and increasing the dose by 1 or 2 Cc. daily, or on every other day, until 10 Cc. are given, if so large a number of doses are required.

In the treatment of all cases of arthritis therapeutic limitations must be constantly borne in mind. If the synovial membranes are chiefly involved the proposition is entirely different from one in which the joint itself is acutely invaded. It must depend upon the virulence of the organism, upon the resistance of the individual, and upon the changes which have taken place in various tissues affected before treatment is resorted to. Until some method of classifying or gauging these cases can be devised reports from different clinicians will vary widely. Diphtheria antitoxin is no longer expected to save the life of a patient suffering from a virulent form of the disease, unless it is given early enough to exercise its effect before irremediable tissue changes have occurred. The same thing holds true in regard to the use of phylacogen, or any method of treatment which is applied for the relief or cure of arthritic conditions.

SUBSTITUTES FOR SALVARSAN AND NEOSALVARSAN IN THE TREATMENT OF SYPHILIS.

The difficulties which have existed during the last few months in obtaining salvarsan and neosalvarsan have naturally turned the minds of members of the profession to the question as to whether satisfactory substitutes could be utilized. In Canada a preparation virtually identical with salvarsan is now manufactured and widely sold, and during the time that salvarsan and its ally were practically unobtainable in this country Schamberg of Philadelphia placed upon the market a substitute or identical preparation which, since the introduction of a new supply of salvarsan, has had to be withdrawn under the patent law. Both the preparation made in Canada and that made in Philadelphia have given fully as good results as those made in Germany, but at the present moment cannot be obtained in the United States.

Some years ago no less a leader than the late J. B. Murphy of Chicago advocated the use of cacodylate of sodium in large dose in the treatment of syphilis, claiming that he had obtained excellent results from its employment. Because of its comparative cheapness and the ease with which it can be obtained a large number of practitioners have followed his footsteps, and, in some instances, the hypodermic administration of cacodylate of sodium in syphilis has seemed to be distinctly beneficial. The point, however, is as to whether it is distinctly curative in the sense that it is capable of destroying the spirochete of syphilis.

Notwithstanding the high hopes which we had when salvarsan was first introduced, to the effect that this new compound would destroy every sprochete in the body, hopes which were speedily dashed to the ground by experience, it would, nevertheless, appear that salvarsan or neosalvarsan is the most efficient destroyer of the spirochete that we have, unless possibly sodium salvarsan, a still newer compound, proves ultimately equally efficacious.

So far as the cacodylate of sodium is concerned, the point is not as to whether the patient improves under its use, but whether the spirochetæ in his body are promptly destroyed so that he ceases to be a disseminator of the disease and ceases to be a hotbed for the multiplication of the spirochetæ, which will attack his own tissues. Recent investigations have seemed to indicate that as a destroyer of spirochetæ cacodylate of sodium is powerless. Nichols,

Cole, and others, the first using animals and the latter experimenting with mankind, have proved that its spirocheticidal property is almost, if not quite, *nil;* that it does not change a positive Wassermann test into a negative test, nor heal the mucous patches which so frequently disseminate the disease. While it may exercise some good effect upon the skin lesions of syphilis, these effects do not approach those induced by mercury or potassium iodide, and these facts apparently hold true even when the dose which is given is larger than is commonly thought safe.

These facts are by no means surprising when we consider the nature of cacodylate of sodium. While it is true that by its use we can inject into the body a greater amount of arsenic than we could with safety if the older preparations of arsenic are used, it must be borne in mind that this is because the cacodylate of sodium is broken up with so much difficulty and gives off its arsenic so slowly that, while the dose which is injected may be large, the dose of active arsenic which the body receives in general is comparatively small. Cyanide of potassium is exceedingly poisonous, but ferrocyanide of potassium is innocuous, not because the hydrocyanic acid in one compound is any less powerful than the other, but because the latter compound is so stable that practically no hydrocyanic acid is set free after the compound is ingested.

In this connection an interesting question arises as to whether neosalvarsan can be considered as an efficient substitute for old salvarsan. There has been in the past much difference of opinion in regard to this matter, based possibly upon clinical observation without great accuracy, and upon the fact that the manufacturers of neosalvarsan admit this to be the case, and direct that larger doses are essential if effects similar to those induced by salvarsan are to be obtained. Trimble and Rothwell have attempted to decide this point by careful investigation of syphilitic patients. They believe that they have proved that there is no great difference in the therapeutic value of the two preparations, and, because of the ease with which neosalvarsan is administered and the small quantity of liquid which must be injected when it is employed, they believe that it is the superior compound. So far as we know, this seems to have been the general opinion of many competent practitioners with the proviso that the dose has to be larger than that of salvarsan. That is, the compound neosalvarsan does not provide the arsenic in sufficient quantity and in proper form to accomplish the results induced by salvarsan unless a larger dose is used.

It is interesting to note a point which most workers in this field have already emphasized, namely, that Trimble and Rothwell believe that four injections of salvarsan or neosalvarsan in the treatment of syphilis are quite inadequate, and that the use of these drugs, unless they are followed by mercury, is also inadequate. These facts cannot be too widely disseminated. Doubtless fifteen or twenty years from now many cases of syphilis of the nervous system will be met with in patients who have been assured that they have been cured by the administration of salvarsan or neosalvarsan, but in whom the infection has only been submerged and not eradicated, as it would have been had mercury been faithfully employed. There seems to be little reason for considering that a patient with a well-established infection is safe, so far as his own constitution is concerned, any sooner to-day, since the introduction of salvarsan, than he was prior to its introduction. This may be a somewhat exaggerated way of stating the matter, but it serves to emphasize what we have constantly taught, namely, that salvarsan may be compared to a chemical engine, which is efficient in putting out a fire in its early stages which threatens great damage, whereas mercury is to be compared to the fire engine, which is always called upon to eradicate a conflagration which is actually in its full vigor.

Finally, it would seem probable, from our increasing knowledge of various infections and from what we are continually learning concerning the activities of salvarsan, that

all syphilitic infections are not identical in virulence and that some strains of spirochetæ are much more insusceptible to antisyphilitic remedies than others.

We are glad to see that Baum, of Syracuse, and Schamberg, of Philadelphia, have recently emphasized this point and have also called attention to the fact that certain strains of spirochetæ have a greater affinity for certain tissues than for others. Ever since Rosenow showed so clearly that microörganisms dwelling in certain tissues develop an affinity for similar tissues in other hosts it has seemed likely that spirochetæ derived from mucous membranes would have an affinity for these tissues which will be greater than spirochetæ derived from the vascular, renal, or hepatic tissues, and this, perhaps, explains why salvarsan seems so efficient in one case and so feeble in another; the most noteworthy instance being in so-called late syphilis of the central nervous system, in which Noguchi has proved the presence of living parasites in the perivascular spaces, in which spaces the salvarsan, either directly or indirectly, seems incapable of thoroughly exercising its powers.

ANTISEPTICS, BACTERIA, AND TISSUE CELLS.

Ever since the discovery of bacteria as a cause of disease medical men have been hoping that some antiseptic substance might be discovered which would have a more deleterious effect upon invading parasites than upon the cells of their hosts. From time to time certain bold spirits in quest of such a method of treatment have gone so far as to inject into the tissues, or even intravenously, substances which are known in the test tube to act as germicides, ignoring the undeniable fact that as a class bacteria are infinitely more tenacious of life than the highly specialized cells of the human body, and that, therefore, the introduction of germicidal substances in the body in sufficient quantity, or strength, to destroy invading parasites will first destroy the tissues of the host. Formaldehyde, corrosive sublimate, and many other powerful germicides have been so used, sometimes with disastrous effects, and sometimes with no effect at all if they were sufficiently dilute. In future there is good reason to believe we may discover germicides or antiseptics which will have such a specific affinity for the protoplasm of certain bacteria that these bacteria will be destroyed, leaving the protoplasm of the patient untouched. As yet, however, we have only two substances which approach this much-to-be-desired ideal, namely, quinine on the malarial parasites, and salvarsan for the parasites of syphilis, and even these two so-called specifics are capable of exercising such a deleterious effect upon other tissues which are naturally susceptible to their influence, or which are rendered susceptible by disease, that they are not in the class of innocuous remedies which we ultimately hope to obtain. Not only is this true as to bacteria which are widely scattered through the body, but it is also true in regard to localized infection. When antiseptic surgery first came into play it was not infrequent to see wounds treated with such strong solutions that healing was materially delayed and even necrosis induced.

In the *Journal of Experimental Medicine* of December 1, 1916, Lambert contributes a paper in which he throws considerable light upon the comparative resistance of bacteria and human tissue cells to certain common antiseptics. He studied connective tissue cells and wandering cells derived from human beings *in vitro* in modified plasma, using tuberculous glands and Hodgkin's disease glands removed at operation, and spleens taken out at autopsy a few hours after death. The organism which he employed was the staphylococcus aureus, which he chose because of its frequency in infections and because certain investigators have shown that it occupies a middle position among pathogenic bacteria in its resistance to disinfectants, being more resistant, for example, than the streptococcus and less resistant than the bacillus pyocyaneus. He used two strains of staphylococci, one from the throat of an

apparently healthy individual, another from a case of furunculosis, and found that there was little difference in the resistance of these two strains to the chemical used. The substances which he employed were mercuric chloride, potassium mercuric iodide, potassium cyanide, Dakin's solution, iodine, phenol, trikresol, argyrol, hydrogen peroxide, glycerol, and alcohol.

It is interesting to note that iodine stands out as the one chemical to which the cells of the body were found to be more resistant than were staphylococci. Thus a growth of cells occurred after exposure to a 1:2000 solution of iodine for one hour, although this strength of iodine was sufficient to sterilize the tissues completely in most instances so far as the growth of staphylococci was concerned. Lambert, therefore, concludes that iodine approaches closely an ideal disinfectant, since it kills bacteria and does not seriously injure connective tissue cells or wandering cells. On the other hand, both iodine and Dakin's solution possess the power of dissolving fibrin and would therefore seem to be disadvantageous in that the wound is deprived of the natural plastic substance which facilitates healing.

CLINICO-BIOLOGICAL RELATIONS OF THE SPERMATOZOA.

The attitude of the profession at large concerning spermatozoa is to the effect that they look like tadpoles, live long under favorable conditions, quickly perish as the result of the application of any antiseptic or acid, and that provided they move they are undoubtedly capable of fertilizing an ovum. An unfertile marriage is usually attributed to defect on the part of the woman, a man being cleared as a deterrent factor if he has any motile spermatozoa in the ejaculation.

Much detailed information has been collated by Lespinasse (*Mississippi Valley Medical Journal*, March, 1917) which tends to a larger conception of the morphology of the spermatozoa and to a broader view as to the possibility of departures from normal other than immotility which may render it inapt in fertilization. He notes the presence of a head and a tail and an indistinct neck-piece. In the tail there is a connective piece, a principal piece, and an end piece. Seen from the surface the head is oval, and in side view it is elongated, pear-shaped, the tail being attached to the broader end; upon each surface of the head there is a slight depression. According to Waldeyer one sees a constriction between the head and the connecting piece which is an indication of the neck. By staining, the head cap can be brought into view, its posterior border marking off an anterior and a posterior portion of the head. The anterior sharp border of the cap represents the perforatorium; the neck is in the form of a disk, which is formed by the anterior centrosome bodies, the noduli anteriores, and a homogeneous intermediate substance, the massa intermedia. The succeeding connecting piece begins with the noduli posteriores (the posterior centrosome bodies) and ends with the annulus, and includes, therefore, the region of the posterior centrosome, which during spermatogenesis has divided into these two portions. The filum principale of the tail traverses the axis of the connecting piece, extending to the proximal portion of the posterior centrosome. In this region the filum principale has a delicate investment which probably passes over posteriorly into the thicker sheath of the tail and finally ends at the beginning of the filum terminale. Around this delicate sheath is the spiral sheath, and external to this the mitochondria sheath. The spiral sheath consists of a spiral filament, not recognizable in the mature spermium, and an intermediate substance, the substantia intermedia. The mitochondria sheath is the matrix of the spiral filament and is characterized by the presence of mitochondria granules. Beginning with the principal portion of the tail the spiral and mitochondria sheaths terminate, but the inner thin sheath is probably continued into the involucrum of the tail. The tail constitutes four-fifths of the entire length of the spermatozoon.

After quickly repeated intercourse variation in the size of the heads of the sperm are relatively common; occasionally they are double-headed. Few of these sperm with large heads have a normal motility; most of them have no motility at all. The neck-piece is frequently enlarged and thickened, so much so that it appears as a collar. Timed to cross the one-sixth field, the spermatozoa make this journey in about eight to ten seconds when the semen is about one hour old. In four to six hours there is usually immobility, the motion becoming more and more undulant.

The sperm was the first cell to which antibodies were developed. Hence the spermatozoon is the father of the Wassermann reaction. Minor degrees of defects in the sperm are common. Thus it may take the individuals fifteen to twenty seconds to cross the one-sixth field. Under such circumstances the use of pituitary gland in doses of from 20 to 100 grains daily seems serviceable. Direct uterine insemination may be indicated.

Duhrssen observed live sperm in a diseased tube nine days after the patient came into the hospital and three and a half weeks after the last intercourse. They have been found motile in a testicle three days after death. Ahlfeld kept the sperm alive eight days at body temperature. They swim against a current (rheotapic), the current exercising a directing force. Even dead spermatozoa lie with the head against the current. Waldeyer notes that in 7½ minutes spermatozoa will cover a distance of 27 mm. There is an average of about 60,000 sperm per c.mm., which will be about two to three million sperm in an ejaculation. It is estimated that in the lifetime of man he produces 340 billion spermatozoa, and as woman produces about 200 ova in each ovary during her lifetime there is produced for each ova 850 million sperm.

As a conclusion to this interesting summary on the morphology and movements of the spermatozoa, the author concludes that even motile spermatozoa may be unable to fertilize ova; that a careful examination by a skilled examiner may detect errors in the formation or motility which may be corrected by administering pituitary gland. He believes that in some cases the slow movement is responsible for the failure to impregnate, and that direct uterine insemination is indicated here.

It is doubtless true that in exceptional cases motile spermatozoa may be unable to fecundate. Clinical evidence seems clearly to show that spermatozoa which fail to impregnate one woman may successfully operate in the case of another, and *vice versa—i.e.*, the woman who has not become fertile with one strain of a spermatozoa may readily become so from another; this showing that both a woman and a man may be potentially fertile, but not so one to the other.

Examination of any emission usually shows wide variations in form, outline, size, and motility of the individual spermatozoa. It seems fair to assume that while some are dead, others moribund, and others non-fertile, of the three million contained in an ejaculation many would be found entirely normal and entirely capable of performing their function. It yet remains to be proven that a man in whose emission are found actively or even sluggishly motile spermatozoa is incapable of impregnating a potentially fertile woman.

SALVARSAN TREATMENT OF SYPHILIS.

In spite of the now recognized fact that salvarsan varies both in strength and toxicity, as do all similar compounds to an extent, and in spite of the fact that its use even when most skilfully applied is attended by possible dangers, this drug is given not only by the expert but by the bulk of the profession, and with a degree of safety which is astonishing considering its potentialities for harm. Individual records are therefore of vivid interest, and the report of Lloyd Jones and A. J. Gibson (*British Medical Journal*, Feb. 3, 1917) on 200 cases of primary and secondary syphilis treated by intravenous injections of salvarsan and

intramuscular injections of mercury between May 22, 1916, and September 24, 1916, is worthy of note.

The method was that laid down by the War Office and was divisible into three parts:

Part A calls for 8 doses totaling 1 gramme of mercury; 2.8 grammes of salvarsan; given in 52 days.

Part B, 14 days potassium iodide.

Part C, eleventh to thirteenth week; three doses of mercury; 1.2 grammes of salvarsan; given in 15 days.

The full course of treatment is as follows:

First week, 2 doses of salvarsan (0.3 gramme); 1 dose of mercury. Second week, 2 doses of salvarsan (0.3 gramme); 1 dose mercury. Third week, 1 dose of mercury. Fourth week, 1 dose salvarsan (0.4 gramme); 1 dose mercury. Fifth week, 1 dose salvarsan 0.5 gramme); 1 dose mercury. Sixth week, 1 dose of salvarsan (0.5 gramme); 1 dose mercury. Seventh week, 1 dose salvarsan (0.5 gramme); 2 doses mercury.

In a large percentage of cases a negative Wassermann reaction and absence of all clinical signs and symptoms have been obtained by the end of Course A. If the Wassermann reaction is still positive at the end of Course A, potassium iodide in 10-grain doses, three times a day for fourteen days, is then prescribed. If still positive Course C is given.

All the cases treated were conclusively shown to be syphilitic by the Wassermann being positive, or the presence of spirochætæ pallidæ in either primary sore or secondary rash. None were treated on a purely clinical diagnosis, unless the signs put the diagnosis beyond all doubt.

The 200 cases were composed of 125 primary and 75 secondary; not picked cases, but the first 200 treated in the course.

At the end of Course A, of the 125 primary cases, 16, or 12 per cent, showed a positive Wassermann. In 75 secondary cases, 43, or 55 per cent, still showed a positive, and 32, or 45 per cent, a negative Wassermann reaction.

Of the 43 secondary cases showing a positive reaction at this point, 16 ceased treatment for the following reasons: Eleven were showing marked symptoms of stomatitis, having had large quantities of mercury before this course; three had marked albuminuria; one refused more treatment; and in one the treatment was stopped owing to the violence of the reaction. At the end of Course B with potassium iodide the following results were obtained:

Of the 16 primary cases with a positive reaction, six, or 38 per cent, still showed a positive, and 10, or 62 per cent, showed a negative Wassermann reaction; two of these six cases ceased treatment owing to stomatitis.

Of the 27 secondary cases with a positive reaction, 16, or 59.3 per cent, still showed a positive, and 11, or 40.7 per cent, showed a negative Wassermann.

At the end of Course C (further treatment with 1.2 grammes salvarsan and 3 grammes mercury) the following results were obtained:

All the primary cases, which numbered four, showed negative reactions, and of the 16 secondary cases 10, or 62.5 per cent, were still positive, and six, or 37.5 per cent, were negative.

Of the 200 cases which started treatment, 182 completed the full course where necessary. Of these 172 had negative Wassermann reactions, namely, 123 primary, or 98.4 of those starting, or 100 per cent of those completing the full course; and 49 secondary, or 65.3 per cent of those starting, or 81 per cent of those who completed the full course.

It is possible that a certain number of the secondary cases may show a negative reaction in a short time, as the final blood tests were taken directly the course had been finished.

The reactions shown by the patients under treatment with salvarsan twenty-four hours after the patients had an injection may be grouped under the headings mild, severe, and local. The figures used are obtained from the 200 cases already quoted; in all 1320 injections were given.

Of the mild reactions headache was

noticed in 27.3 per cent of the injections; diarrhea in 29.3 per cent; vomiting some time after injection, 15.3 per cent of injections; abdominal pain, 18.4 per cent of injections.

The authors cheerfully class these symptoms as neurotic or due to an improper diet.

In the second group of severe reactions they include cardiac, respiratory, and central nervous symptoms, vomiting at once, rash, rigors, severe diarrhea, albuminuria.

Cardiac and vascular symptoms were typified by flushing of the skin and widespread vascular dilatation, tachycardia, and bradycardia; irregular pulse; often dyspnea and a muddled mental condition.

Respiratory difficulties were for the most part subjective. Dyspnea and paroxysmal cough were noted, the latter starting immediately, with shortness of breath.

The nervous manifestation may take the form of unconsciousness either immediately or some time after the injection. Transient hemiplegia was observed once and lasted three days.

Immediate vomiting seems to be akin to the paroxysmal cough, starting as soon as the injection is commenced. This condition was met with three times in the same man, who was of rather a nervous temperament; he finally had to stop treatment owing to the severity of his reactions. He exhibited at different times upon the table vomiting, flushing, slow pulse, semiconsciousness, and all four at the same time.

Diarrhea was at times troublesome, and some patients suffered from a mucous colitis, with the passage of blood-stained mucus for a few days.

Rash may appear in the form of erythema, which is a warning to moderate the doses; urticaria, which completely disappears; herpes, facial or labial, not uncommon. One case developed acute exfoliative dermatitis.

Rigors usually occur two to six hours after injection and last for about twelve hours, the temperature running even up to as high as 102°.

Albuminuria is usually transient.

Rash and rigors are the commonest forms of severe reaction, and thereafter diarrhea. These reactions are exceptional. It is noted that acute neuralgia occurs during injections of salvarsan, due in all probability to the fact that the gums are inflamed with mercury, although they may show no outward signs of inflammation. The pain quickly passes away at the end of the injection, and leaves no after-effects.

As to the local reactions, local bruising and hematoma are due to the operator injuring the vein to a greater or less extent at another point to that through which he finally introduces the needle. This may be avoided by introducing the needle through the skin first and then passing it through the lateral wall of the vessel. By this means the vein does not slip away from the needle-point, as it has a tendency to do if an attempt is made to get into the lumen in one motion from above.

Lymphangitis is due to local infection and should not occur. The same is true of abscess formation. Necrosis at the seat of injection is due to allowing the injection to run into the cellular tissues around the vein. This can be avoided by first running in distilled water to make sure that the needle is in the lumen. If by chance the needle slips out during injection, owing to the patient moving, it is best to take a scalpel and open over the swelling and thoroughly clean out any solution loose in the tissues. The incision made will heal much more quickly than the necrosed area that will otherwise appear.

Thrombosis is due in a large percentage of cases to rough usage. One man whose veins were easily punctured had a local thrombosis after each injection. Soft thrombi sometimes form during the injection, and it is then dangerous to proceed. One first sign of local thrombosis in such a case is hindrance to the flow from the needle.

The practitioner should be cautioned against stopping injections too soon. The general tone and appearance of the patient improve markedly after one or two injections of salvarsan, and the primary sore disappears. If the injections are stopped

too soon relapses will occur with almost absolute certainty. The treatment should be continued until all signs of reaction have disappeared and the blood reaction is negative.

Mucous membrane lesions of the mouth and tonsils are affected less readily by salvarsan, and they do not usually heal until the blood has got to a negative phase. until the blood has got to a negative phase.
summation would have had added value if the practitioners had noted the body weight and the general vigor, both mental and physical, at the beginning and at the end of this somewhat intensive treatment. Although it is well to have a definite procedure and a fundamental standard dosage, these require in the handling of spirochetal infection wide individual departures; otherwise certainly, in private practice, unfortunate results will occur.

The broad general principle in treating syphilis is to give as much of the specific medicines, to wit, mercury and arsenic, as is compatible with complete health; to avoid scrupulously even a beginning intoxication; to strive for a negative Wassermann in the primary stage of the disease; to be content with perfect health under repeated treatments in the secondary and tertiary stages. An enthusiastic effort to convert the positive Wassermann of an old healthy syphilitic into a negative is usually both futile and hurtful. Such patients should, however, receive intermittent treatment for life.

REPORTS ON THERAPEUTIC PROGRESS.

INDICATIONS FOR WET PACKS IN PSYCHIATRIC CASES.

ADLER in the *Boston Medical and Surgical Journal* of November 9, 1916, submits an analysis of one thousand packs given at a psychopathic hospital. He states that the wet pack, as it is usually given, consists of a number of sheets wrung out in water at about 100° F., and wrapped tightly around the patient's body and limbs—so that he cannot move anything except his head, fingers, and toes—and an outside wrapping of blankets pinned with large safety-pins, so that the patient cannot roll out of them. When the patient is so restless and active that in spite of this he is likely to fall out of bed in consequence of a flexion and extension of his entire body, a restraining sheet or blanket is placed over him and pinned to the sides of the bed, and the foot end of the pack may be attached by means of a blanket and safety-pins to the cross-bar at the foot of the bed. In this way the patient is completely trussed and practically immobilized. In fact, this is so obvious that the change from the violent agitation to the immobilization caused by the pack is so striking that it must appear to many that the chief object of the pack is restraint, and is quite comparable to a strait-jacket or any other form of restraint. As will be seen later, nothing can be further from the truth than this conception, and yet the similarity seems so great that even the attendants and nurses—not to say the physicians—frequently treat the pack as a form of restraint, and order it as a means of relief for themselves or the other patients from the disturbances caused by one who is merely noisy.

Where the degree of excitement is such that the gentle effects of the prolonged bath are not adequate, the restraining influence of the pack may be required to put the patient in the condition for the prolonged bath. The wet pack is applied for two hours. The patient is then removed whether he be still disturbed or not. If the patient has not fallen asleep or is not completely restored to quiet and self-possession, he is then placed in the prolonged bath.

The ideal temperature for the prolonged bath is not over 98° F. and not under 95° F. The water should be kept continually at this temperature, and the body should be

immersed as far as possible in the water. The object of the pack is to produce an envelope of water or moisture-laden air at body temperature, and maintain this for the length of the pack. It has been shown that whether we start with cold water or warm water, the temperature of the pack readily adjusts itself to that of the body. In cases of maniacal excitement, even though the patient may have fever, the surface of the body is losing large amounts of heat. It is wise, therefore, to start with hot sheets rather than cold sheets—the idea being to conserve as much of the body heat as possible.

The patient should be given water to drink freely throughout the pack, and an ice-cap should be placed upon the head, and a cold compress on the forehead, which should be frequently renewed.

In cases of alcoholism or drug addiction, or in cases that have been exhausted by prolonged febrile diseases, there is a certain amount of danger from collapse in the pack. Following the experience in European clinics, as well as in this country, a hypodermic injection of digipuratum, or digalen, has been given almost as a routine in these cases. The ordinary preparations of digitalis, such as the powdered leaves, the tincture, or the extract, require sometimes as much as twelve hours before the effect is obtained. They are, therefore, useless for this purpose. The hypodermic preparations are much more prompt in their action, and have given excellent results. Since the outbreak of the war, however, it has been impossible to obtain these drugs except at prohibitive prices, and stimulation with strychnine or camphor has been resorted to in cases in which there seemed to be a danger of cardiac collapse. [Digitalone is an efficient substitute.—Ed.]

While the physicians who have been employing the pack in a proper fashion have all become convinced of the fact that it is a valuable therapeutic measure and in no sense to be compared to mere restraint, they have found this difficult to prove in individual cases; and in the face of charges brought by paranoid patients or their relatives, they have found it difficult to convince a prejudiced bystander of the difference.

With this idea in mind, a closer study was made of a thousand packs that had been given in the course of routine management of the patients, and the results of this study are herewith presented. These cases were gathered from unselected clinical material in the order in which they were given, and represent 309 patients. The diagnoses, organic and psychiatric, comprise a large variety, and only one factor was taken into consideration in the present analysis, namely, whether the patient was quieted by the pack or not.

According to this analysis, out of 309 cases, 155 were quieted by the packs, 56 were not quieted by the packs, 98 were quieted by some and not quieted by others, or, in other words, the pack had a partial effect.

For the sake of convenience, Adler has grouped only the main classifications together. Cases diagnosticated manic depressive insanity and dementia præcox are very nearly equal in number—79 of the former, 82 of the latter. But 326 packs were given in the 79 cases of manic depressive insanity, with a quieting effect in 144, without quieting effect in 218 packs, whereas in the 82 dementia præcox cases but 217 packs were given, with quieting effect in only 74.

The same disproportion is shown by the cases of manic depressive insanity showing agitated depression. In 8 cases 26 packs were given, 8 with quieting effect, 18 without quieting effect. In all the other groups, including general paresis, delirium tremens, alcoholic hallucinosis, and epilepsy, by far the majority of packs had a quieting effect.

It would seem, then, that excitement in conditions other than manic depressive insanity is to be considered rather as a secondary manifestation, and one which is more easily controllable by hydrotherapy. Even in the cases of manic depressive insanity, of course, a quieting effect was obtained a large number of times, but the

packs that were given without quieting effect outnumbered those that had a quieting effect, indicating thereby, also, that the duration of the state of excitement and the intensity of the excitement are greater than in the other diseases.

These results are quite different from those obtained by the use of restraint without hydrotherapy. It is unnecessary here to recall the remarkable improvement in the condition of excited patients produced by the modern methods of non-restraint, in which diversion and occupation take the place of padded cells, strait-jackets, and strong rooms.

More to the point, perhaps, will be the startling figures obtained in a study of the treatment of delirium by hydrotherapy at the Psychopathic Hospital, Boston, compared to the results of the older methods of restraint and depressing drugs without hydrotherapy, employed at general hospitals. The mortality in general hospitals averages 26 per cent; the mortality in the Psychopathic Hospital, under hydrotherapy, more especially packs, averages 0 per cent.

On account of these facts, it is safe to infer that hydrotherapy, whether applied in the form of prolonged baths or as wet packs, has a therapeutic effect, which is not to be obtained by mere immobilization of the patient or by restraint.

The question of restraint, of course, is an important one for administrative reasons. However, these figures prove that the wet packs not only cannot be condemned for reasons of cruelty, but that they are the most potent means of obtaining rest for a maniacal patient. The wet pack has been used at the Psychopathic Hospital consistently as an auxiliary to the prolonged bath, and bears the same relation to the latter that hypodermic medication bears to medication per os. A patient who cannot or will not swallow medicine may still derive the benefits from the drugs when they are administered subcutaneously. A subcutaneous injection of heart stimulant, for instance, may be applied against the wishes of an insane person. It may be applied in cases of unconsciousness and so forth. It offers a means of applying a therapeutic agent without the coöperation or even the consent of the patient. In the same way the pack may be used to administer the beneficial effects of hydrotherapy, and in particular of the prolonged bath, to patients who are so restless or excited that they cannot be induced to submit to the prolonged bath.

TREATMENT OF CEREBROSPINAL SYPHILIS.

GROVE, in the *American Journal of Insanity* for October, 1916, after reporting cases of cerebrospinal syphilis treated by him, concludes:

1. It is too early in the modern treatment of cerebrospinal syphilis to draw definite conclusions, but evidence shown warrants the effort in early cases.

2. There is little to be hoped from treatment in advanced cases; hence the crying need of an early diagnosis.

3. Negative history and a blood negative Wassermann might prove misleading; hence the necessity for examination of the spinal fluid.

4. There is strong evidence to show that injurious effects might come from too large doses of antisyphilitic agents given intradurally.

5. That the thorough saturation of the system with antisyphilitic agents is the end hoped for—hence all methods of treatment should be relied upon used conjointly.

VACCINE THERAPY.

In the *Journal of the American Medical Association* of January 20, 1917, DAVIS points out what we have called attention to in our editorial columns, namely, that recent work tends to show that many substances, the so-called foreign proteins and their derivatives, may, when injected slowly into the veins, quickly cause a severe chill followed by high fever, leucocytosis, and certain changes in the blood, especially the appearance of ferments. These proteins

may be derived from disease germs or they may consist of other animal substances, as serum, proteoses, and milk. After the rather severe reaction, marked improvement and even permanent cure may result in certain diseases, especially typhoid fever, and in rheumatic and gonococcus infections. This may be due to the high fever and to increase in the ferments and leucocytes of the blood. Other factors are probably at work.

The non-specific effect of vaccines is just now probably the most important problem that concerns the vaccinationist. The possibilities of development along this line are many, for the principle concerns an immense number of diseases, both in man and the lower animals. Questions concerning ultimate cure, recurrences, relapses, and dangers cannot now be justly appreciated because of lack of data.

This form of treatment should be referred to neither as specific nor as vaccine therapy. It is non-specific, and usually, but not necessarily, protein therapy.

The important domain of vaccines is protective, not curative, according to present data.

IMPOTENCE IN THE MALE AND THE USE OF THE ANTERIOR LOBE PITUITARY BODY.

STELLWAGEN in the *New York Medical Journal* of November 4, 1916, states that his attention was first called to the use of pituitary body in general weakness by an observation upon a patient to whom the preparation was given in a purely empirical way. He was suffering from premature senile decay. The patient, a man aged forty-eight years, had some undefinable and unexplainable weakness for which anterior lobe pituitary body was given.

He showed decided improvement, and during the course of his treatment remarked that he felt a return of sexual desire, also that his powers of erection, which had been negative for some time, seemed to be returning. This latter fact he dwelt upon so frequently that it determined Stellwagen to apply it in the treatment of such cases. He has tried the preparation in three cases of younger men suffering from sexual neurasthenia, but with no special improvement. This fact he does not attempt to explain, but he feels that in them the nervous element so predominates that it governs the situation, and that unless some means are found to put it in abeyance, all methods of treatment must fail. In short, he has tried to impress upon them that they must be philosophical in order to gain by the treatment.

No untoward symptoms have been produced by the administration of the preparation, except slight hyperacidity of the gastric juice. In other cases now under observation this hyperacidity is present, consequently it may be of use in achylia gastrica. It is his intention at a later date to offer a more complete study upon another series of cases.

The fact that prostatic massage and some other remedies were used in the treatment of a number of his cases in a measure invalidates the testimony in favor of the anterior lobe pituitary body; nevertheless, he feels that the preparation played a very decided part in their cure. Indeed in some patients the effects were remarkable. Previous to its use, the methods that were resorted to generally failed. The dose employed averaged 5 grains three times a day.

PITUITRIN IN LABOR.

The *British Medical Journal*, of December 23, 1916, contains a communication from AGNEW in which he states that the article in the *British Medical Journal* of October 14, by Drs. Haultain and Swift, on the morphine-hyoscine method of painless childbirth, was very interesting to him. He happened to be engaged at an extremely prolonged and tedious confinement at the time. He had administered grain 1/100 of hyoscine in the first stage, and the patient got some much-needed sleep. As on previous occasions on which he had used the drugs, he was not satisfied that he had not prolonged the labor—probably he had given

the injection too early. It is quite evident, however, that the proper method of procedure, as summarized by Drs. Haultain and Swift, completely bars the use of morphine-hyoscine in private midwifery practice. This is unfortunate on account of the demand there is for "painless childbirth," brought about by the booming of the subject in the lay press. However, he is finding considerable satisfaction in the discriminate use of pituitrin. The injection of 0.5 Cc. in the late first stage acts like a charm. The initial pains resulting are often very severe and tetanic, often continuous, but soon subside and become more like normal pains. He is satisfied that a quick labor, such as often occurs after the use of pituitrin, is gratifying to the patient in every way. Chloroform can be used in addition, but instrumental labors in his practice are becoming surprisingly less frequent. In two recent cases of breech presentation pituitrin probably saved the infants' lives.

THE USE OF VACCINES IN DISEASES OF THE EAR, NOSE, AND THROAT.

COATES in the *Journal of the American Medical Association* of January 20, 1917, states that probably the most general adaptation of vaccines to ear, nose, and throat practice has been their use for the prophylaxis of acute rhinitis or common cold not only by the specialist, but by the general practitioner, the country over—so much so, indeed, that patients now demand the so-called serum treatment. The mere fact that it has come into such general use by physicians and the general demand by the laity would indicate at least some value in this method. Most of the immunization is, of course, necessarily done with the aid of commercial mixed vaccine of the many well-known different brands on the market. It would be manifestly impossible to culture the causative organisms for the next cold from every nose at present in healthy condition, although it is probable that in a certain proportion of cases organisms would be obtained from which competent vaccines could be made. In case the patient is subject to repeated acute colds, cultures taken during one of these may be used for vaccine preparation and prophylaxis against future ones, with most excellent results.

Taking it for granted then that the use of vaccines for the prophylaxis of acute rhinitis is of value, one would naturally ask of how much value this method is. Many cases, of course, will fail to respond, due probably to the fact that the organism causing the cold is not in the vaccine used, whether it be autogenous or commercial mixed. For it is quite possible that in taking the culture from the nose the causative organism may not be obtained. In this relation the work of G. B. Foster, recently published, in which he seems to demonstrate as an etiologic factor in acute rhinitis minute filter passers or filterable toxins, would very readily explain these failures. By accepting this work as being of great value, we must not forget that the old, well-known organisms do cause a certain percentage of rhinitides, or at least by secondary infection prolong them to their customary length, and when due to them vaccine treatment will prevent or cure a very considerable proportion.

The duration of immunity depends much, of course, on the amount of exposure, the individual peculiarities of the patient, the amount of vaccine given, and the presence of epidemics. For instance, a patient subject to acute attacks of rhinitis every few weeks may be so immunized that the interval will be stretched to six, eight, or ten weeks or longer. The individual who has one or two bad colds during the winter may be immunized so that he will go from year's end to year's end without any. These immunized patients frequently start apparently to have colds—that is, sneezing, sniffling, coryza, etc., which symptoms pass off in the course of a few minutes or a few hours. This is readily explained if we consider the probable etiology of many colds. Change in temperature of the air inspired or impinging on certain dermal surfaces excites reaction in the vasoconstrictor and vasodilator and secretory centers and corresponding relaxation of the nasal mucosa, an

increase of blood, secretion, sneezing, etc. Here it probably is that the infection takes place and prolongs the cold. If the patient is immune to infection the cold disappears with these few symptoms.

In this connection a word or two on the treatment of acute colds is appropriate. If colds are treated early, there is no doubt that a great many of them may be stopped short—that is, within twenty-four hours. But, of course, to do this an autogenous vaccine cannot be used, nor can a bacterial diagnosis, as a rule, be made on account of the shortness of the time. Acute tonsillitis is in precisely the same category. The well-known rôle that acute rhinitis in repeated attacks plays in diseases of the ear will at once convince the aural practitioner of the value of this prophylaxis. While the actual condition may or may not be improved by the vaccine, there can be no question that the lengthened interval between attacks and the diminished severity of them make it possible to obtain results in the treatment of recurrent acute catarrhal otitis media and chronic catarrhal otitis media that are not possible without some such method of treatment for the nasal condition.

THE DURATION OF PARESIS FOLLOWING TREATMENT.

In the *American Journal of Insanity* for October, 1916, DUNTON and SARGENT write on this subject and say that as a conclusion it may be stated that the duration of paresis following treatment by the Swift-Ellis method is about half that of cases treated by the older methods.

HEMATEMESIS AND ITS TREATMENT.

CROSS in the *Long Island Medical Journal* for January, 1917, gives the following advice as to the control of hematemesis:

First, there is the need of the most absolute physical and physiologic rest and quiet—accomplished by rest in bed and the free exhibition of morphine hypodermically, and the avoidance of any and all feeding. When a feeding schedule is resumed, it must be characterized by the utmost conservatism for several days.

What shall be said of the oral administration of medicaments? Such a drug to be of value must do one of two things: either act locally on the muscular coat of the bleeding blood-vessel, or assist directly in the formation of a clot. If the hemorrhage is small, ten to twenty drops of the usual stock 1/10-per-cent solution of adrenalin chloride is worthy of trial. The adrenalin must come directly in contact with the damaged blood-vessel and exert hemostasis before its chemical composition can be altered by the gastric ferment, as its action is due to local effect on the muscle of the vessel walls, or possibly the nerve terminations contained therein. If the gastric enzyme has been fixed by the blood present in the stomach or the stomach comparatively empty as the result of recent vomiting, we can hope for local absorption of the adrenalin before it can be chemically changed. Granted that contact of adrenalin solution and ruptured blood-vessel is effected, we may look for physiologic action of the adrenalin in lasting from one-half to two hours.

Ewald's suggestion of gastric lavage with ice water is interesting: it is at least rational, tending to cleanse the stomach and to stimulate the wall of the damaged blood-vessel to contraction by the application of cold. A brave man would therefore have logic-sustaining courage, if he used it.

What remedies have been suggested as of value in assisting the formation of a clot at the bleeding point? Calcium salts, through contributing to the formation of fibrin ferment, are in this group. But given per orem they are irritant and frequently provoke vomiting: given per rectum they are rarely retained long enough to be absorbed. Consequently they are not of much help in an hour of trouble. Large, bulky doses of insoluble bismuth salts probably act mechanically. Ten-grain capsules of gallic acid may be well borne.

It will be interesting to note what value will be ultimately assigned the thrombo-

plastin suggested by Hess and tried out so successfully in the throat operations of the Children's Clinics of the New York Department of Health as reported recently by Cronin. Hess has proposed the use of its solutions intravenously in acute internal hemorrhage.

There are a number of substances which must be considered because of their tendency to limit the hemorrhage by facilitating the formation of a blood-clot when given subcutaneously. Cross refers to the group of biologic products of which horse serum is the type. This particular serum is very valuable in doses of 20 Cc. When repeated the possibility of anaphylactic phenomena supervening must be borne in mind. Coagulose, a sterile soluble powder containing fibrin ferment from the horse, is on the market commercially. Dissolved in water at 98° and injected subcutaneously in doses of one ampoule of the original preparation in 15 Cc. or half an ounce of water, a second dose can be given in one or two hours, and in persistent hematemesis a daily schedule of three or four doses can be followed for several days. Its use is very advantageous, and there is this to especially commend it—it is readily obtainable in an emergency.

Human serum or fresh human blood may be used subcutaneously without the fear of anaphylaxis, but the serum is ordinarily not at hand, save in large hospitals, and one must bear in mind in the contemplated use of fresh human blood the ever-present danger of lues.

When the hemorrhage is large or profuse, the effect of the withdrawal of such an amount of blood is to precipitate the patient into shock, with pallor of the skin and mucous membranes; cold, sweaty extremities; small, rapid, feeble pulse; and dyspnea. The indication for a supporting dose of morphine is plain, and the question of saline hypodermoclysis must be considered. There are those who raise a doubt as to its advisability, but the consensus of opinion is that it has a real value, the same value that it has in other conditions of posthemorrhagic shock. Its slow absorption, comparatively speaking, makes for restoration of blood volume without the rapid increase of blood-pressure that would favor continuance or augmentation of the hemorrhage. The Murphy drip of normal saline is of unquestioned utility, if the rate of dropping is not so great as to induce expulsion of the total amount of fluid given. This admittedly is largely a matter under nursing control. Direct transfusion of blood in this day of the simplification and perfection of the technique of this surgical measure would be of value in desperate cases, adding a factor in blood-clotting that the subcutaneous injection of saline does not present.

To recapitulate, then, the treatment of gastric hemorrhage is rest in bed with physiologic rest of the stomach, morphine hypodermically, adrenalin by mouth, the subcutaneous use of a blood-coagulating element, and treatment of incidental shock with fluids given carefully per rectum or subcutaneously. Individualization in treatment is essential.

In this none-too-satisfactory treatment we may console ourselves with the fact that the immediate mortality of hematemesis is 5 per cent or less.

THE TREATMENT OF ACUTE BACILLARY DYSENTERY.

FISHER in the *British Medical Journal* of January 13, 1917, in writing on this subject says that the aim in deciding upon a diet is to find one which will sustain the strength of the patient without leaving much residue to pass into the large bowel. In accordance with this principle, cases are only allowed albumen water, barley water, and lemon water for the first forty-eight hours. This may seem rather drastic, but he is sure it is the correct treatment. Also this period of abstinence from food combined with an aperient is generally sufficient to cure the simple gastroenteritis, and such cases can then be discharged to duty two or three days later. Coincidentally with the improvement of the general conditions of the patient with true dysentery,

his diet is gradually increased somewhat upon the following lines:

Breakfast (7 A.M.): Two or three eggs and tea.
Lunch (11 A.M.): Jelly or arrowroot and a piece of chocolate.
Dinner (1 P.M.): Beef tea and milk pudding.
Tea (4 P.M.): Custard and tea.
Supper (7 P.M.): Cocoa or biscuits.
During the night bovril or a little Horlick's malted milk.

Milk is not allowed except in the form of pudding or custard, as it is much too bulky for an acute or chronic dysentery. In addition it passes through the intestines, and by giving the stools an intense green color tends to mask their character.

Upon this diet many cases increase in weight. No further increase is allowed until the patient has been two consecutive days without passing more than two stools in any twenty-four hours, after which bread and butter is added, and chicken follows in two or three days more. It is very important that this period of abstinence be enforced in order to give the inflamed and damaged intestine time to recover.

Fisher believes that the irritation and secondary infection caused by increasing the diet too soon after cessation of acute symptoms is one of the chief causes of the cases of postdysenteric colitis which are so resistant to treatment.

The fulminating cases need further consideration. On account of the subsequent griping, beef tea, bovril, and similar tasty foods are not indicated, but stimulants may be required. Fisher has found the latter to do good, though in most textbooks they are stated to be contraindicated. In these cases also the mucus may persist so long, the patient becomes so emaciated, and the bowels remain so weak and irritable, that it may be advisable, for the purpose of increasing the strength and general resisting powers of the patient, to add to the diet before all signs of active dysentery have disappeared.

In view of the frequent complaints that the constant desire to go to stool robs patients of sleep, it may seem at first sight that some theoretically sedative mixture such as bismuth or chlorodyne is indicated in order to ease pain, diminish the diarrhea, and thus allow of sleep.

In a few of Fisher's earlier cases he adopted this line of treatment, in spite of the fact that by so doing he was locking up, in intimate contact with the bowel wall, the noxious matter and organisms which the intestine had been doing its best to expel. He found that the effect on the pain was transitory, and that what little sleep was obtained did not refresh the patient, who, on the contrary, began to complain in addition of headaches, flatulence, and a nasty taste in the mouth. He found further that the diminution of the diarrhea was only apparent for two or three days, and afterwards became as bad as, if not worse than, before, and the stools from being odorless became foul. It is to be presumed, also, that the damage to the intestinal mucosa was greater in proportion to the length of time during which this pseudosedative effect lasted.

The drugs above all others which ease pain and allow of sleep are those which aid rather than oppose the effort of nature to free the host of the poison which is invading him, or to neutralize it *in situ*.

Reliance must therefore be placed on specific treatment — namely, multivalent and antidysenteric serum. This receives material assistance from such aperients as the sulphates, castor oil, and liquid paraffin. The former in particular are said to be absorbed in the first part of the alimentary canal, and to be excreted through the mucosa of the large gut, where they exercise a marked exosmotic effect. They thus conduce to lavage from within outward of the diseased mucosa, and wash out the morbid material in the process.

Fisher's treatment has therefore been magnesium sulphate one drachm thrice a day for the first few days, and then, as the stools diminished in frequency and improved in appearance, the amount was gradually reduced. This applies to practically all cases, and seems to him of such importance that he would again emphasize the fact that these drugs instead of increasing the diarrhea diminish it, for by wash-

ing out noxious material and cleansing the bowel they get rid of much of the irritation. Larger doses than those which he has mentioned are not indicated, as they may nauseate the patient, increase his discomfort, and perhaps, by scouring too completely the intestinal wall, open the door to bacterial infection of the blood by secondary infecting organisms.

Sometimes in bad cases morphine is needed, and for very severe tenesmus a suppository of cocaine one-half grain and iodoform three grains will be found most useful. A hot-water bottle will in the early stages add to a patient's comfort. With the above medicinal treatment, combined with the requisite specific treatment, there is marked improvement in the majority of cases within forty-eight hours. For those patients, however, in whom a dry, furred tongue persists indefinitely he sometimes prescribes pure water one pint thrice a day, and so far has found this very satisfactory. Rectal lavage with 1-in-1000 solution of copper sulphate and mist. simaruba often benefit more chronic cases.

With regard to multivalent antidysenteric serum, no hard-and-fast rule can be laid down as to the quantity it may be necessary to inject. Each individual case must be judged upon its merits, with the proviso that cases coming under treatment late in the disease require larger doses than those of equal or even greater severity seen at the onset. In the more severe cases Fisher injected 80 Cc. into the flank within a few hours of admission, but he generally leaves milder ones until the following morning, and then may give 40 or 60 Cc. Some of the latter do not require serum, but he has noticed that a severe case given serum immediately after admission often recovers more rapidly than a mild one treated without it.

One large dose of serum is sufficient to cure some cases; others, though much improved, require more, and in these patients, after waiting forty-eight hours, he gives a further 60 or 80 Cc.

This amount has been sufficient to cure some very severe cases, but a few of the worst may need a third or even a fourth dose. Some cases of the fulminating variety have been given 140 or 160 Cc. serum within twenty-four hours of admission, but in these patients the first injection should, if possible, be given intravenously, for every moment saved is of vital importance.

In the majority of patients antidysenteric serum acts like magic, but there are a very few in whom it seems only to have a slight beneficial effect. If four doses of 80 Cc. each, spread over a period of six or seven days, have not brought about the desired result, Fisher does not think further injections are indicated; consequently, he has never yet given more than 320 Cc.

As a general rule there is a distinct rise of temperature within twelve hours of the injection of the serum, and sometimes this may last forty-eight or seventy-two hours. Fisher looks upon this phenomenon as a good prognostic sign, for in all cases in which it has been marked the patients have recovered rapidly. It is on account of this reaction, which may be rather severe, that he generally allows forty-eight hours to elapse between each injection of serum.

The onset of true serum disease has been most frequent on the seventh and eighth days after the first injection. The severity of the symptoms has varied with the stock of serum in use. The patients have complained of urticarial rashes, headaches, sore throats, arthritis, and edema of the scrotum. They always have a rise of temperature, and five of them showed signs of cardiac dilatation. Those symptoms have occurred in varying degrees of severity in 70 per cent of the cases to which serum has been given.

The results obtained in the cases Fisher has treated along the lines above indicated may now be summarized. He has had altogether 456 definitely diagnosed cases. They are made up as follows:

One hundred and sixty cases between August 30 and December 31. During this period the pressure of work was so great that it was impossible to keep notes of them all, and in consequence, although an ac-

curate diagnosis of the type of dysentery present was made at the time, he is not now able to give exact figures.

Two hundred and ninety-six cases admitted from January 1 to May 31. Of these 183 were acute bacillary cases, and the remaining 113 were either chronic amebic or bacillary. In this period only one case of acute amebic dysentery was admitted.

In the first 160 cases two deaths occurred. Both patients came from Gallipoli; one, a bacillary case, died the night of admission, and the other, which was a "mixed case," died of a perforated amebic ulcer.

There were no deaths amongst the 113 chronic cases, but five were invalided to England and one to Cairo on account of persistence of symptoms. Possibly others may have been invalided from the convalescent homes to which they were sent.

THE INFLUENCE OF ANTISEPTICS ON THE ACTIVITIES OF LEUCOCYTES AND ON THE HEALING OF WOUNDS.

Bond in the *British Medical Journal* of December 23, 1916, brings before us the facts derived from a study of the movements of pigment particles when introduced experimentally into wounds in relation with the known facts about the spread of infection in the tissues and the behavior of phagocytes toward ingested organisms.

First, as regards the phagocytes, Rous and Jones showed that certain kinds of pathogenic organisms, when ingested by leucocytes, were thereby protected from the bactericidal and bacteriolytic action of antibodies present in the serum. On the death of the phagocytes, the organisms so liberated were capable of renewed growth. The same observers also found that potassium cyanide in N/150 concentration killed typhoid bacilli while free in a suspension of guinea-pig's corpuscles, without killing those cells, but that the bacilli which had been ingested by the corpuscles were protected from the action of the potassium cyanide and grew when the emulsion was plated out. Goadby, from a bacteriological examination of sinuses and from a consideration of the action of autogenous vaccines in preventing the reinfection which so frequently occurs in sinus cases, concludes that reinfection is closely associated with phagocytic action.

Dr. Cresswell Shearer and Dr. Warren Crowe have recently shown that the meningococcus may be ingested by human leucocytes in large numbers without undergoing digestion, and they have recovered living germs from these leucocytes in a number of cases. They also bring forward evidence in favor of the view that under certain conditions the leucocytes may act as the carriers of the infection from the nasal passages to the central nervous system. The recovery of pigment-loaded leucocytes from the cerebrospinal fluid after spraying the nasal mucous surfaces with some innocuous pigment would go far to settle this problem.

Bond's own observations suggest that return-immigration of leucocytes is intimately associated with the spread of infection and recrudescent sepsis in wounds.

In the second place, the part played by the fixed tissue cells in infection is a very important one. The observations of Kyes show the important part played by the hemophagic cells of the liver and spleen in destroying pneumococci injected into the general circulation of the pigeon, and Bull, at the Rockefeller Institute, has shown that intravascularly agglutinated bacilli ingested by polymorph leucocytes are carried to the liver and spleen and ingested by the cells of those organs. In this paper Bond has described the process of ingestion by the fixed tissue cells of pigment granules carried by leucocytes and the ingestion of pigment granules brought about by phagocytes to the liver and spleen cells. The exact method by which the transference of pigment is effected, whether by internment of the leucocytes *en masse* or by a process of disengorgement and reingestion, requires further elucidation. It is, however, clear that a close analogy exists between the transportation of pigment by wandering cells and the

spread of infection in wounds. The spread of infection is due to a breakdown in one or more of the factors on which phagocytosis depends. Either the wandering phagocytes do not emigrate into the invaded area in sufficient numbers, or, having emigrated, they do not ingest the organisms, or the breakdown of the defensive mechanism may occur at a later stage. The phagocytes may emigrate and successfully intern the invading organisms, but they may fail to digest them, or things may go wrong during return-immigration. The organisms may be liberated by the leucocytes while still alive, just as the pigment granules may be liberated, and they may retain sufficient virulence to originate a recrudescent infection in a new area. It is quite likely that some part of the autointoxication which attends the too frequent movement of infected limbs may depend on a liberation of ingested organisms brought about by injury to germ-containing leucocytes rather than to a mechanical pumping of the organisms or their toxins into the tissues.

If it be true that some part (how large a part is at present unknown) of the spread of infection in wounds is due to a breakdown in the defensive mechanism of phagocytosis, of which return-immigration is only one phase; if, in other words, a certain number of pus cells in infected wounds reënter the circulation or the tissues carrying ingested but still living organisms with them; and if a certain proportion of the latent infection in sinus cases and the recrudescent sepsis which breaks out in healed wounds is due to this same cause, then any method of wound treatment to be successful must deal with the problem of the return-immigration of germ-laden phagocytes. The subject is one, however, of great delicacy and difficulty. If antiseptic solutions when applied to wounds are sufficiently strong to kill the phagocytes and their cargoes, and so prevent their reëntrance into the tissues, they will also inhibit emigration and phagocytosis. The irrigation of a wound with normal saline favors emigration and ingestion, but it does not prevent return-immigration. The application of hypertonic saline, on the other hand, may prevent return-immigration by killing the leucocytes, but it also checks emigration and phagocytosis.

A few experiments have been carried out to test the effect of various antiseptic agents on the capacity to ingest pigment or starch by the leucocytes and pus cells exposed to the action of such reagents when applied to wounds. The pus from a case of compound fracture of the tibia in which a cup-shaped granulating wound was dressed with the mixture of iodoform, bismuth subnitrate, and liquid paraffin known as "Bipp," to which also some sterilized rice-starch had been applied, showed that the percentage of leucocytes containing starch grains was reduced, while the proportion of starch grains free in the discharge was increased, although a considerable proportion of the pus cells from the same wound retained their vitality.

It is interesting to note that the starch grains in the pus from wounds that have been treated with the iodoform, bismuth, and paraffin paste are colorless. The grains in the interior of the phagocytes and the free grains only show the blue color characteristic of the presence of free iodine after that reagent has been added. This bears on the question of the liberation of iodine in wounds dressed with iodoform paste.

Samples of pus from wounds previously dressed with gauze soaked in Dakin's solution (Daufresne's formula) with the addition of a little rice-starch show that the inhibitory effect on the ingestive capacity of the leucocytes is less marked than in pus from wounds dressed with the iodoform paste. In one superficial granulating and healing wound, dressed twice daily with soaks of Dakin's fluid, nearly all the starch grains were ingested by the leucocytes in the fibers of the gauze dressing.

Certain facts stand out prominently in this world-wide and still unsolved problem of the routine conversion of infected into sterile wounds in war. An experiment in immunization is now being carried out in Europe on a colossal scale. The control of the virulent infection set up in wounded tissues is far and away the biggest factor

in the problem of the treatment of wounds in war. One is struck by the rapidity and efficiency of the immunizing process as carried out by nature in some cases and by the failure of it in others. The difficulty is that we cannot distinguish beforehand those cases in which it will succeed from those in which it will partly or completely fail.

DIAGNOSIS AND TREATMENT OF TRACHOMA.

In the *Medical Record* of January 6, 1917, CARHART reminds us that the treatment of trachoma is medical or surgical or both, according to the indications and type of the disease. In the children's clinics of the Bureau of Child Hygiene they are mainly interested, of course, in the medical treatment of trachoma, and he briefly mentions first the remedies which have been or are used to cure trachoma or ameliorate its symptoms. As trachoma is a purely local disease, local applications of various antiseptics or astringents have been used with varying results for many years to destroy the focus of the disease in the tissues of the lids. Among these one of the oldest remedies is the pencil of sulphate of copper, but of recent years they have found this bluestone to be apt to cause excessive cicatrization of the conjunctival surface, besides being quite painful if used at all thoroughly without the aid of cocainization. When used at all, it should be confined to the milder cases of passive papillary trachoma with small hard nodules and practically no secretion. De Schweinitz in his latest edition still mentions it favorably for selected cases. The time has gone by when hundreds of cases of trachoma were treated indiscriminately with touches of bluestone. Where used on the vascular type of follicular trachoma, it seems to aggravate the general infiltration. Recently a five-per-cent ointment of copper citrate, as originally recommended by F. R. Von Arlt, if followed by gentle but thorough massage, seems to work better than bluestone in selected cases of papillary trachoma. For the past ten years or more a solution of 1:500 or 1:300 bichloride of mercury has been rubbed by some oculists on the conjunctival surface with an applicator, and this bichloride rubbing is said to work well when properly done. If done thoroughly, it is somewhat severe and is said to need 10-per-cent cocaine instillations to allay the discomfort. Of course, it is hardly applicable in the presence of corneal involvement for fear of doing more harm than good, nor is it allowable to use such forcible rubbing as to cause bleeding from abraded surfaces to any considerable extent. This bichloride rubbing has been practically discontinued elsewhere, although used occasionally in their clinics.

Another old remedy is nitrate of silver, which still works well in one-half to one- or two-per-cent solutions for certain cases of follicular trachoma, but argyrosis must be avoided by using the remedy intermittently and in weak solutions wherever possible. The writer has recently seen several marked cases of staining of the fornices and conjunctival surface by prolonged use of nitrate of silver. Argyrol is a silver remedy which was supposed not to cause argyrosis, but this is not strictly true, although it is very much safer than nitrate of silver. He is personally fond of using argyrol in 25-per-cent solution in follicular trachoma with marked vascularization and considerable secretion, since he thinks its high penetrating power checks the severe symptoms, even if it does not cure the disease. Prince, of Springfield, Ill., renews the claims of sulphate of copper instilled into the eye, a most useful application in some cases. Its action seems to be similar to the old tannin and glycerin solution 30 to 60 grains to the ounce, which depended for whatever effect it might have upon its astringent qualities. Prince uses a watery solution of copper sulphate, freshly prepared daily as needed. In the later stages of follicular trachoma with large masses of vascular granulations 30- to 50-per-cent boroglyceride can be rubbed over the lids with a cotton-wrapped applicator, and this remedy does nicely to combat excessive shrinking of the conjunctival membrane, and prevents to some degree the distortion

of the lid structure so common in old trachoma.

A number of other remedies have been tried with varying results by different oculists; among them are solutions of permanganate of potash (1:3000 or 1:5000 instillations and 1:500 or 1:1000 directly applied), ichthyol, itrol in powder, and iodoform or aristol in powder or salve. Electrolysis is advocated by some experts, Dr. Cleaves for instance, who claims that it increases the absorptive effect of appropriate remedies, but the writer personally has no experience with it. Radium and the *x*-ray have also been tried with some reported success. Recently autogenous vaccine therapy has been considered.

The writer's opinion as to medical treatment leans to the side of some ointment like the 5-per-cent copper citrate he has mentioned, well rubbed in by gentle but thorough massage either directly or through the closed lids. The choice of the remedy is not so important as its proper application by this thorough massage. The application so performed takes more time than hurried instillations of solutions or touching up with bluestone, but if we are not to sacrifice the quality of our work in the mad rush for quantity, we, far above our efficiency records for speed and swollen statistics, must consider the welfare of our patients, these helpless children.

All trachoma cases are liable to more or less severe exacerbations of symptoms of ocular discomfort, lachrymatous and mucopurulent secretion, and while these exacerbations persist, astringent, painful, or harsh remedies of any kind are distinctly not in order, as we must for the time being treat these cases very much as we do any acute conjunctivitis, that is with copious, warm boric acid cleansing, bichloride of mercury solution 1:5000 or 1:10,000, mercuric cyanide 1:1500, argyrol or protargol instillations, or other mild collyria. Our motto should be, to quote Jacobi's phrase in other matters, *non nocere* (not to harm), and the writer is sure we do very much better in vascular stages of even chronic trachoma to make haste slowly. Of course, during these exacerbations of secretion of muco-pus, the children should be excluded from school or treated in special ophthalmia classes, as this stage of their trachoma is violently contagious.

Dr. Wiesner has discussed so well the main complication of trachoma, namely, the corneal involvement which we call pannus, that the writer need not refer further to its treatment.

As to the surgical treatment of trachoma, all surgical procedures aim to shorten the duration of the disease by removal of the follicle-bearing tissue in the lid structure. Of these methods of treatment the old expression operation or some modification of it, if properly performed, is still exceedingly useful. Expression, grattage, and other similar methods should be limited mainly to non-vascular types of trachoma where there is little or no secretion or engorgement of the lid structure. Pronounced papillary trachoma does not usually do as well with expression as trachoma characterized by large sago-grain follicles, a type by the way which our bacteriological friends insist is not true trachoma. Trachoma complicated with either corneal involvement or pronounced vascularization is not suited to expression, but should have persistent and thorough medical treatment, followed, if at all, by a Heisrath-Kuhnt tarsal excision in competent hands. Personally, the writer believes an early Heisrath-Kuhnt operation, carefully performed at the first suspicion of corneal ulcer or pannus, will practically always prevent the development of these destructive complications of trachoma by removing their cause in the irritative pressure of the infective and rough trachoma granules, and he so advises his private patients and others whenever he notices the cornea to be involved in the slightest by either ulcer or pannus. Some years ago Dr. H. W. Wootton and the writer performed at the Manhattan Eye, Ear and Throat Hospital a number of Heisrath-Kuhnt tarsal excisions with gratifying results in relieving symptoms and hastening the cure of the trachomatous condition. About nineteen children, the first year or

two, came under his personal operative care, some of them being sent from the Children's Clinic, and all of these children were markedly benefited. At that time this operation was new in America, and Dr. Wootton and the writer were the first oculists in the eastern part of the United States to develop it, although now it is quite the routine procedure in many localities for trachoma with corneal complications. This operation acts well when properly performed because the removal of the tarsal cartilage takes away all friction and pressure on the cornea, thus relieving the eyeball of the constant irritation of the trachoma nodules. Of course, also the entire adenoid layer of the lid which bears the trachoma follicles is removed, and thus if thoroughly and properly performed the disease is radically cured by removal of its cause. The writer has said so much about this Heisrath-Kuhnt operation because he believes it is the only radical cure for trachoma with complications whenever medical treatment faithfully tried has failed in severe cases to effect a cure. Of course, it is quite an important operation and demands hospital, not clinic, facilities.

All operative measures, whether expression or radical cure, require careful after-treatment, and most of the relapses and poor results, if not due to careless operating, can be laid to insufficient or inadequate post-operative treatment.

ABUSE OF SOAP.

To the *Liverpool Medico-Chirurgical Journal* for 1916, BARENDT contributes an exhaustive article on this topic. He thinks there is no doubt that many patients are addicted at one time or another to the over-use of soap. They make a fetish of their favorite brand, and pride themselves upon their love of cleanliness; and their smug superiority to those who are not so soapy is only too patent. Even the best soap can be abused. The alkali may chip and furrow the epidermis, and produce slight scaliness over the prominences of the face and hands —regions more washed than any others. Barendt has often seen these furfuraceous patches on the faces of members of the Medical Institution—not sufficiently serious, perhaps, to hie them to a specialist. In children they are frequent, and it is these patches due to abuse of soap which are apt to become inoculated with microörganisms and finally portray the picture of impetigo. Among the poor the household soap is used for washing the body. If the soap is what is termed a quick washer—*i.e.*, made from copra—it requires a considerable quantity of alkali to saponify it, and consequently when used with water a corresponding amount of alkali is set free. This is probably an explanation of the number of cases of impetigo seen among hospital patients.

Nurses often use too much soap on their patients, especially when these are confined to bed. The secretion of the skin is sluggish, and the excessive removal of the natural grease leaves the skin rough and branny. As those patients who are bedridden show this state of skin most frequently, it has been described as pityriasis tabescentium by authors of old medical works.

Surgeons before they adopted gloves for operations, with their well-known zeal for cleanliness, constantly used too much soap, and their hands suffered. The skin was scabrous, red, and undoubtedly invited dissemination of microörganisms. Their surgical forefathers laid great stress on the cleaning of the skin. Old books on surgery constantly speak of "mundifying the region," and "when thorough mundification has taken place." But they were careful not to be too vigorous, as some modern surgeons would appear to be, in mundification. More than once Barendt has seen untoward effects, pruritus and redness, resulting from too much soap being used at the site of operation, and the surgeon querying in his mind whether it is erysipelas that has supervened.

Many patients suffering from pruritus without any apparent cause will be found to be using too much soap. Bath pruritus is really due to the action of the alkali on an overwashed skin; itching around the ori-

fices is constantly aggravated, and perhaps more often fretted into existence than most medical men think, by abuse of soap. The delicate skin of new-born babes has been irritated through the mistaken zeal of the nurse in oversoaping to remove the vernix caseosa. The intertrigo of the napkin area in infants is frequently caused by abuse of soap. Frictional eczemas are invariably aggravated by soap and water. A moment's consideration explains the situation. Soap is brought into contact no longer with the external layers of epidermis, but with the delicate deeper layers never intended to be exposed to external influences. Soap acts as a foreign body to the skin, and as such must be kept away if further injury is to be prevented.

TREATMENT OF PLACENTA PREVIA.

HELLIER in the *Practitioner* for January, 1917, does not suggest that every case of placenta previa should be treated by Cæsarian section, but he does say that, when once the malposition of the placenta has been diagnosed, when the patient is not in labor or is only just beginning, and when the genital canal has not been infected, the treatment by Cæsarian section, in the hands of a man accustomed to abdominal work, and under those conditions now at our command in almost every town having a surgical clinic, is a very excellent method of dealing with one of the most serious emergencies which the accoucheur is called upon to face.

CLINICAL CONDITIONS WHICH MAY BE ACCOMPANIED BY ACIDOSIS, WITH THEIR TREATMENT.

Writing in the *American Journal of Obstetrics and Diseases of Women and Children* for January, 1917, PEASE recalls the fact that an acidosis may be produced in three ways: (1) By the introduction of acids from the outside, as for instance through the alimentary tract; (2) by a failure in the excretory organs so that acids which are normally excreted are gradually accumulated in the blood stream; and (3) an insufficient amount of alkali in the organism, perhaps as the result of abnormal loss of bases.

Probably the most common clinical condition in children which may be accompanied by acidosis is so-called food intoxication.

The symptoms of acidosis are first restlessness and sleeplessness, which gradually change to somnolence and finally to coma. Inspiration and expiration become more and more exaggerated, in order to increase the ventilation of the lungs, and finally develop into dyspnea of the "air hunger" type. There may be a small amount of sugar in the urine. Prostration is severe and there is evidence of an enormous loss of fluids. The death-rate has been in the neighborhood of 80 per cent. The amount of actual diarrhea present bears no constant relation to the degree of acidosis. A prominent symptom of the onset is the severe vomiting, which ceases as the child passes into coma, and may or may not return as recovery takes place. Clinically the relation between this type of diarrhea and milk can be clearly traced, and the suspicion that the milk was stale is highly probable. A complete elimination of milk from the diet for days offers the most hope of ultimate recovery. The nourishment is supplied by the use of thick gruels and solutions of glucose. If conditions are not too desperate a period of starvation of twenty-four to twenty-eight hours would as a rule see the end of the acidosis, which might recur if even a small amount of milk was given. In connection with the suggestion that milk might be a cause of acidosis, it may be observed that a large majority of cases occur during the summer months, and especially during particularly hot weather. High fat and sugar feeding result in diarrhea, but such diarrhea is not in any circumstances accompanied by acidosis, though they do make the child more susceptible to the conditions which result in acidosis. It is a question that has not yet been satisfactorily answered if this type of acidosis is not in reality a form of acute proteid indigestion, since with the high proteid feeding of the present

day proteolytic processes become most prominent in the intestinal tract.

Closely related to the form of acidosis which accompanies the above type of diarrhea is recurrent cyclic vomiting. While acetonuria appears very promptly in recurrent or cyclic vomiting, not all of the cases exhibit definite symptoms of acidosis, in part probably the result of rapid compensatory excretion of acids and in part perhaps due to the vomiting itself. A period of starvation is likewise indicated in acidosis of this nature. A matter which has not received the attention it deserves, both in recurrent vomiting and ileocolitis with acidosis, is the frequent appearance of very large amounts of indican in the urine. This is often a transient finding which disappears, particularly if there has been vigorous treatment. A carbohydrate peak in the food does not seem to suggest itself as an etiological factor in either of these conditions. There are other less frequent conditions occurring in children which may be accompanied by acidosis, as diabetes and acute nephritis. In both the acidosis does not often manifest itself except as a terminal condition. Pneumonia is accompanied by a reduction in the carbon dioxide content of the blood, but the facts seem to have little if any relation to the severity or duration of the disease. This is a point that is worthy of further and more extended observation. The acetonuria which frequently follows anesthesia rarely results in a disturbance of respiration or in a lowered carbon dioxide tension, if Pease's limited experience may be considered as any criterion. Extensive burns sometimes result in acidosis.

The treatment of acidosis should be first a period of starvation, and then the return to food should be to carbohydrate and the vegetable proteids, milk and broths being added very slowly and cautiously. The acidosis itself must be handled by neutralizing the acids. Sodium bicarbonate may be given by mouth, per rectum, intravenously, and under the skin, in an amount sufficient to render the urine alkaline in reaction. If given under the skin the sodium bicarbonate must be specially prepared. The solution may be sterilized, and when cold carbon dioxide bubbled through it until the phenolphthalein which has been added is colorless. The solution for intravenous injection should be of 4-per-cent strength and from 75 to 100 Cc. should be given, according to the size of the child. By mouth from 10 to 15 grains of sodium bicarbonate may be given every three hours.

ACUTE CARDIAC FAILURE: TREATMENT BY INTRAVENOUS INJECTION OF STROPHANTHIN.

In the *Liverpool Medico-Chirurgical Journal* for 1916, HAY in a paper on this subject reaches these conclusions:

1. Acute cardiac failure is due in very many cases to the onset of auricular fibrillation in hearts already handicapped by disease.

2. It has been proved that of all drugs the digitalis group is the most potent in steadying such hearts.

3. The onset of the cardiac failure is sometimes so sudden and the downward progress so rapid that oral medication may prove too slow to be of any service.

4. Again, at times the patient's stomach will not tolerate any member of the digitalis group; a vicious circle is set up which ends in the death of the patient.

5. In such cases strophanthin injected into a vein produces immediate definite slowing of the heart and rapid amelioration of the patient's condition, and without doubt has saved many lives.

THE USES AND ABUSES OF PITUITRIN.

RAWLS in the *Virginia Medical Semi-Monthly* of February 9, 1916, reiterates the statement that the chief use of pituitrin is to stimulate uterine contractions in cases of inertia, in which there is no mechanical obstruction to delivery. When it is first given there are from one to three prolonged contractions. In the multipara with the cervix completely dilated the delivery is often accomplished during these

pains; if not, the uterus settles down into regular, rhythmical contractions, which are the exact counterpart of a normal labor except that they are harder and more prolonged.

It is claimed that it will not induce uterine contractions *per se*, but Rawls has had several cases in which the patient was at term, or beyond, or in which the uterus from other reasons was ready to empty itself, in which a tube of pituitrin apparently produced the stimulus for uterine contractions. He cites two instances:

He was called one evening at 6 P.M. to see a multipara who, according to her account, was ten days overdue. She stated that she had no symptoms whatever of a labor, and simply wished to know wherein she had missed her count. An examination revealed an almost completely dilated cervix, with the vertex engaged in the superior strait. She was ordered to remain in bed until Rawls' return. When he came back two hours later he found her very much disgusted with the entire proceeding. She looked upon the whole thing as a joke, and stated that she never felt less like being in labor in her life. At 9 P.M. she was given one tube of pituitrin, and in a few minutes regular, rhythmical contractions set in and the baby was delivered at 9.50.

In the second case Rawls had tried to induce labor at eight and one-half months for an intense headache that not even morphine would relieve. He first introduced a thirty French catheter well into the cervix; at the end of thirty-six hours it was removed, the patient having had no pains, and but very little dilatation, with some general softening of the cervix. At this time one-half a tube of pituitrin was given, which caused some ten or twelve pains. Two days later, at 4 P.M., a large size conical bag was introduced into the cervix and distended with sterile water. It came away at one o'clock that night without any pains. The next night she was given another half tube of pituitrin; severe pains were immediately induced, and the delivery was accomplished in an hour.

The action of pituitrin lasts from forty-five minutes to one hour and a half, and no patient should be left for an hour and a half after a dose has been given. If delivery does not occur in an hour after the administration of pituitrin it is his custom to administer a second dose just after the delivery of the child as a prophylactic against postpartum hemorrhage, for the uterus, worn out by its first efforts, will not contract after the expulsion of the placenta; and even this should be further fortified by ergot. The action of pituitrin is fleeting, that of ergot more prolonged. Pituitrin should not be given unless chloroform is in immediate command to mitigate unexpected violence of action. In cases in which it is given for uterine inertia before the cervix has been completely dilated, the initial dose should certainly not be more than .5 of a Cc.

He has been accustomed to administer a dose of pituitrin immediately following curettement for incomplete abortion, but recently he read an article by Furniss, of New York, stating that he gave 1 Cc. of pituitrin fifteen minutes before starting his curettement, claiming that there was less uterine surface to curette, less likelihood of perforation, and less danger of immediate and subsequent hemorrhage. It seems almost unnecessary to caution against its use in primiparæ whose pelvic measurements are not definitely known; in the early stage of labor without a well-dilated or easily dilatable cervix; with the presenting part not engaged or, if engaged, in a malposition; or any other form of mechanical obstruction to a natural delivery; or to cater to the inclinations of the obstetrician to hurry his case; yet the increasing number of ruptured uteri would certainly indicate that there are some who do not thoroughly recognize the contraindications to pituitrin.

Next to its use in obstetrics, the most common use of pituitrin is following operations. It is probably the best intestinal stimulant that we have. The writer has come to rely upon it in those cases of distention following abdominal operation, and orders it as a routine in cases in which a

large amount of handling of the abdominal viscera is unavoidable. He usually gives one tube every four to six hours in these cases, beginning before the patient leaves the table. It has a further use in surgical cases complicated with retention of urine, and no case should be catheterized until pituitrin has been tried. He has found it of wonderful benefit in cases of shock, and places it third only to morphine and hot saline in his treatment of that dread condition. A third use of pituitrin, not so well known as the first two, is its action on hemorrhage. He doubts if it is a styptic in itself; it probably acts on muscular tissue, contracting the arterioles. He orders it as a routine in tonsillectomies and circumcisions in babies who show a tendency to ooze. He has seen it stop very persistent nosebleeds in a short time after administration.

STRABISMUS AND ITS TREATMENT.

In the *Albany Medical Annals* for February, 1917, STAPLETON reminds us that the treatment of squint may be non-operative or operative, depending upon the kind of squint, age of the patient, etc.

If a squint is noticed in a child by the family physician, he should not advise the parents that the eye will in all probability straighten up all right, or that the child will grow out of it. Perhaps the eye may straighten, but usually one will find that the eye which had deviated is partly blind, a condition which probably could have been averted if the child had been treated when first noticed.

The treatment in youngsters consists in refracting carefully under atropine and prescribing the proper correction. This can be done in children as early as a year old. The atropine is usually continued in the fixing eye for some weeks, allowing the deviating eye to return to normal and making it do the work, thus developing the retinal function.

Worth's amblyscope is used for the education of the fusion faculty, also the stereoscope.

Men differ as to the right time for operating. Some say that operation can be performed as early as five, others that the best time is around nine years of age, while in Vienna clinics they prefer to operate after the fourteenth year.

Some operators prefer doing a simple tenotomy, others the advancement, while others choose to combine the above two, doing in some cases a partial or total tenotomy of the muscle that is deviating the eye from the normal axis. At present the advancement operation is the most used, as operators feel that they can control the results better.

AFTER-TREATMENT OF ANTERIOR POLIOMYELITIS.

In the *New York Medical Journal* of February 10, 1917, FRAUENTHAL in writing on this subject says that treatment has a more hopeful outlook when we realize that less than ten per cent of the muscles are totally paralyzed and more than ninety per cent are simply paretic.

One should always carry in his mind the physiological effect of heat, hydrotherapeutics, massage, electricity, and muscle education (as herein described, performed before a mirror) in the treatment of cases of infantile paralysis.

The following salient points are worthy of repetition owing to their importance in treatment:

1. It is advisable to give all treatment early in the morning, the child being then in the best physical condition and having expended little of his recruited strength, which makes a good standard of comparison. The apparent condition of the child is to be noted as a basis to determine the amount of treatment to be given on that particular day.

2. Heating should be carried on to warm the muscle tissue, but not to manifest a perspiration that would be a physical tax. The warming of the skin requires less electrical current for reaction.

3. Massage should be given as a mild stimulant to the muscle and circulation, but

not to exhaust the muscle tissue or to produce pain or irritation of the child.

4. In the administration of electricity, no matter what current is used, it should not be strong enough to give the child pain or act as an irritant. The least possible amount of current that will produce a contraction should be used, and not to a point of exhausting the muscle or until it ceases to contract.

5. In muscle education the exercises should be limited to a time that will not overtax the paretic muscle.

6. In the use of the bath, care should be taken not to have the heat of the water so high as to irritate the skin or to burn it.

7. The very best results, in Frauenthal's opinion, are obtained by administering treatment every other day, allowing the time intervening to recruit the muscle and the general health.

DIAGNOSIS AND TREATMENT OF GASTRIC AND DUODENAL ULCER.

In the *New York Medical Journal* of February 3, 1917, EINHORN asserts that peptic ulcer, as a general rule, should be treated medically. An ulcer, in itself, is not an indication for operation; in a great many ulcers—four-fifths or more—the patients improve sufficiently with medical treatment to attend to their daily work. An operation is always accompanied by some danger, and it is most inadvisable to undergo one unless absolutely necessary. First let us follow the easier plan and see if we cannot help these patients medically.

Not every patient with peptic ulcer shows the same degree of suffering. In consequence the treatment can be arranged accordingly; treatment may be adapted to the mild cases and to those cases showing severe symptoms. It is not necessary to arrange it that way, but it may be done so with advantage. The patient with mild symptoms may say he cannot stay in bed for, say, two weeks, that his business will suffer. He will ask if you cannot advise some other line of treatment. If you say no, he will go away and do nothing. A good plan is to prescribe ambulatory treatment for mild cases, giving them large doses of bismuth with magnesia, restricting meat, but allowing plenty of butter, milk, eggs, and a small amount of chicken. Let them eat frequently and rest as much as possible, lying down for half an hour before meals. For pain give them an opiate, or, still better, atropine. There is no harm in such treatment. If the patient feels better and loses his pain, he can go about his affairs and get rid of his ulcer. He may improve to such a state that he is not suffering and may continue so for a long time. If he needs further treatment the above procedure can be repeated. There is nothing wrong in advocating such palliative treatment, because we must help the patient. In employing the ambulatory treatment it is well not to put the patient on too rigid a diet. He must have sufficient food to keep up his strength. When the symptoms are of a severe type, the best plan is to put the patient in bed.

Cruveilhier was the first to suggest milk as a diet in gastric ulcer, and the same diet has been adopted in practice by von Leube and Ziemssen and others. If the patient is in bed keep him on a liquid diet. The point is mainly to give the organ rest. As soon as the patient begins to improve, he should be given more food. He should be given bismuth, and hot applications should be made to the stomach. Then, as he improves further, the diet should be increased by the addition of eggs, cereals, and meat. The milk diet has been overdone. Many physicians think that a patient with ulcer of the stomach must live a year or more on a milk diet. The writer does not agree with them. For a short time a strict liquid diet may be employed, even if it be insufficient; but for a long period one kind of food always causes some deficiency and the patient usually suffers.

A few words about the Lenhartz diet: Lenhartz was of the opinion that in ulcer of the stomach much liquid should not be given, because it distends the stomach. He thought it essential to give a concentrated diet comprising meat and eggs. According

to the writer's experience it is well to give milk before eggs, but not to extend the rest diet for too long a time.

In dealing with active hemorrhage complete rest is of importance. The stomach should be quite inactive until the bleeding stops. Here rectal feeding is in place. Very often we find that rectal enemas irritate the bowel and also the stomach, causing vomiting. The writer had a woman patient in whom any injection into the bowel caused hemorrhage from the stomach. There was a large hemorrhage following some manipulation of the rectum. He found her pulseless, and he thought she would die. In such an acute condition it is not so much the matter of food but of water in the system which should have our attention. Water infusion is sometimes good. Here we must also resort to remedies that have the effect of checking the hemorrhage. Serum is used a great deal; emetine has some effect; adrenalin is also used. Sometimes these remedies must be combined. Opium and belladonna are of importance in checking peristalsis.

The writer has recently used the duodenal tube in cases of chronic ulcer and acute hemorrhage. The tube does no harm and affords a means of feeding the patient, at the same time keeping the affected area at rest. In a patient with severe hemorrhages, especially a patient in whom rectal irrigation cannot be performed, this is a great boon. In the patient just mentioned the writer introduced the tube at about noontime and then aspirated and got black material. We must aspirate gently. He kept the patient on ice water. The next morning he found that the tube was in the duodenum. He aspirated and got pure bile from the duodenum. He then began with the feeding, and the patient, who had had no food for about six days, could now be given milk and raw eggs. She has had no pain during a period of two weeks' duodenal feeding, and is now up and is getting well.

Duodenal alimentation can be practiced not only in the presence of severe hemorrhages, but also in a chronic case when other remedies fail. The rest treatment plays the most important part in the recuperation of the patient. We know of nothing better than to take the food away from the affected area. No matter what the diet may be, any food must ordinarily go through the ulcerated area. If we introduce the tube and let the food go into the duodenum, skipping the diseased area, healing is promoted. It is the most rational method we have at our command in the healing process of an ulcer.

There are three physicians, Dr. N. de Rosas, Dr. Ruiloba, and Dr. Cabrero Sanavedra, who have succeeded in curing a perforated gastric ulcer by the method of duodenal alimentation. All three live in Havana, Cuba, and Dr. de Rosas has written to the writer about their patient, a case of gastric ulcer with hemorrhage and perforation. In this case a laparotomy had been done for a subphrenic abscess, and it was noticed that when the patient drank milk it came out through the laparotomy wound. Dr. de Rosas applied duodenal alimentation, and in feeding the patient through the tube no milk escaped. In three weeks of duodenal alimentation the wound healed and the patient recovered. The case was so desperate that the patient would have died. The writer has never seen a case of perforation treated in that way, but has usually seen them operated. He thinks that this method of treatment is of greater importance in duodenal ulcer than in gastric ulcer.

Regarding the surgical treatment the following indications can be given: First, if the diagnosis of perforated ulcer of the stomach, duodenum, or other location of the digestive tract be made, the patient should be operated upon, and the quicker the better; second, in obstruction of the pylorus of a high degree the best results are by surgery; in the third place, acute hemorrhage requires no surgery at the time of the bleeding. In recurrent hemorrhages we can do a prophylactic operation in the interval to prevent renewal of hemorrhage. In frequent small hemorrhages surgery is indicated very often, but not always. When-

ever we are in doubt whether or not there is malignant development, the writer usually advises operation in order to give the patient a chance of recovery in case the condition is malignant. These are, on the whole, the most typical indications for gastric surgery.

There is also another possible situation in which operation is feasible, and that is when we do all we can and cannot get rid of the pains which the patient suffers. We try one plan of treatment and another, and still the patient persists in showing unabated symptoms. Here again surgery can be resorted to. The writer cannot say that operation will free the patient of symptoms. He can advise trying it, although the results are not always successful.

SALICYLATE IN THE BLOOD AND JOINT FLUID OF INDIVIDUALS RECEIVING FULL THERAPEUTIC DOSES OF THE DRUG.

SCOTT, THOBURN, and HANZLIK in the *Journal of Pharmacology and Experimental Therapeutics* for January, 1917, point out that it has been claimed (notably by Binz, Feri, and others) that the action of salicylates in rheumatic fever is due to the liberation of free salicylic acid by carbon dioxide whose tension in the blood and other fluids is considered to be high enough for this in fever. Scott, Thoburn, and Hanzlik have tested this by direct extraction of freshly obtained specimens of joint fluid (from individuals suffering with rheumatic fever and receiving full therapeutic doses of salicylate) with ether, acetic ether, and chloroform, and then applying the ferric alum test to the ethereal extracts. By this method they have not been able to demonstrate the presence of free salicylic acid in all the fluids thus far examined (from ten patients).

The ferric alum test is sensitive to about 1:1,000,000 of salicylic acid in 25 Cc. (0.000025 gm.) of solution. It is true that the total volume of synovial fluid obtained in each case was less than 25 Cc., but it must also be noted that in the smallest quantity of fluid (7 Cc.) there was about 32 times (0.0008 gramme) and in the largest quantity (20 Cc.) there was about 140 times (0.0035 gramme) as much total salicylate as the lowest limit of the test which permits the recognition of salicylic acid. In other words, there was considerable salicylate present, but not in the form of free salicylic acid. Any undetected free salicylic acid which might have been present could not be ascribed an important rôle as germicide or antiseptic if it is remembered that about 0.04 to 0.1 per cent is necessary to inhibit the activity of enzymes, and somewhat higher concentrations (0.15 per cent) to prevent the growth of, and about 0.35 per cent to kill, bacteria. Objection might be raised to the method used because of the possibility that some CO_2 is lost when the fluid is exposed to the atmosphere, but this is to a considerable extent prevented by the presence of "buffer" or protective substances.

The symptoms of "toxicity"—deafness and ringing in the ears, nausea and vomiting—produced by salicylate have been attributed by some to acidosis; that is, they are said to be due to or associated with acidity of the body fluids. This is the reason why sodium bicarbonate is commonly administered together with salicylate—*i.e.*, to prevent the occurrence of acidosis. It is hardly conceivable that the true reaction (hydrogen ion concentration) of the blood could be sufficiently altered by salicylate so as to cause real acidity. The same might be said of the mechanism which maintains the reaction constant. However, this was tested out by observing the reaction and alkali reserve of the blood of individuals before and after the administration of full therapeutic doses of sodium salicylate up to "toxicity." The reaction was estimated by the phenolsulphonephthalein dialysis method of Levy, Rowntree, and Marriott, and alkali reserve by the method of Marriott. The results show no noteworthy changes in the reaction and reserve alkalinity of the blood.

The same was found to be true of the blood of animals (cats and dogs) treated

with the same doses, and in some cases even larger doses, of salicylate per kilo. The same methods were used and in some of the animals the blood was observed over long periods of time (three to nine days) after the administration of salicylate was stopped.

These observers therefore conclude that:

1. The percentage concentration of salicylate in the blood and joint fluid of rheumatic individuals receiving full therapeutic doses of the drug is approximately the same.

2. The concentration of salicylate tends to be less in the blood of rheumatic than non-rheumatic individuals.

3. There is no demonstrable free salicylic acid in the joint fluid of individuals suffering with rheumatic fever.

4. The true reaction and the reserve alkalinity of the blood are not perceptibly altered by the administration of salicylate even in large doses.

THE TREATMENT OF SYPHILIS OF THE CENTRAL NERVOUS SYSTEM WITH INTRASPINAL INJECTIONS OF SERUM.

WOLFSOHN in the *American Journal of the Medical Sciences* for February, 1917, states that the facts of greatest interest to the neurologist in connection with the intraspinal mercurialized serum treatment are:

1. There is no danger in its administration.

2. For local treatment it is very efficacious in syphilis of the central nervous system, especially in the treatment of tabes dorsalis, in which lancinating pains are the predominant symptom.

3. Due to its stability the serum may be used at any time after its preparation.

4. The lack of expensive drugs used in its preparation makes it invaluable at this time.

5. There is no objection to a combined salvarsanized and mercurialized treatment.

6. It must not be concluded from the short space of time (eight months) that has elapsed since the beginning of this form of treatment in these cases that relief is going to be permanent. One will have to be cautious about prognosticating a cure until the proper length of time elapses, *e.g.*, at least three years. From the results obtained so far it certainly has mitigated the symptom of pain.

THE DRUG TREATMENT OF MORPHINISM.

CARLISLE in the *Boston Medical and Surgical Journal* of February 8, 1917, states that the various forms of treatment, all of which have their adherents, may be grouped under three headings: gradual, rapid, and immediate withdrawal. His present method is that of rapid withdrawal, and it may for convenience be divided into two periods: first, that of withdrawal, and second, convalescence.

His routine is as follows: A mixture containing scopolamine hydrobromide gr. 1/150 and morphine hydrobromide gr. 1/6 is given hypodermically on the evening of the day of arrival, and repeated at intervals of six hours during the first twenty-four. The early effects of scopolamine usually make their appearance during this period and are manifested by marked dryness of the throat, with difficulty in swallowing, dilated pupils with blurred vision; the speech becomes difficult and rather jerky. The patient may now, or perhaps not until the following day, become mildly hallucinated (visual and auditory). In conversation his sentences are apt to be short, sharp, and often incomplete, due no doubt to flight of ideas and lack of hallucinatory control.

On the second day the intervals for injection are increased to eight, and on the third day to twelve hours. In typical cases the depressant effect of the drug (scopolamine) presents itself at about this time, continuing as a rule to some degree through the third and fourth days. This stage is characterized by a sensation of great fatigue and drowsiness; the excitement is greatly reduced and the patient seeks his bed and should obtain sleep of from four to eight hours' duration.

On the fourth day there may be some nervousness and gastric disturbance, but usually no craving for morphine. At bedtime the final dose of the scopolamine-morphine mixture is given, together with fifteen grains of trional. This is almost invariably followed by a comfortable night's sleep, lasting from six to eight hours.

Active purgation is obtained during the withdrawal period, through the liberal use of compound cathartic pills, cascara sagrada, and salines. It is of vital importance that the bowels should be made to act thoroughly each day in order to rid the system of morphine and its by-products, but the drastic catharsis recommended by some authorities does not in his experience appear necessary.

He frequently encounters individuals who fail to respond to the usual physiological effects of scopolamine, and is then obliged to modify his treatment, increasing or decreasing the rapidity with which the injections are made. It often occurs that through an apparent immunity on the part of the individual the intervals must be reduced to two or three hours until full response to it is obtained, then lengthening the interval as the case may require. About two per cent of Carlisle's cases show an idiosyncrasy to scopolamine, which makes it necessary to discontinue its use and resort to treatment by gradual reduction. These show little more than exaggerated throat symptoms and dilatation of the pupils, are exceedingly uncomfortable, and are never able to progress as far in their treatment as the depressed phase.

On the whole he is, in the majority of instances, enabled to remove the morphine from the addict's system with reasonable comfort in a period of about four days, leaving him in fair general condition. At this time what may be termed convalescence begins.

There is no specific treatment for morphinism, and no treatment, whatever the procedure adopted, can be successful in its results unless it is followed by a prolonged period of convalescence. Carlisle wishes to lay special emphasis upon this point. Many forms of treatment, having much to recommend them in other respects, fail through the neglect of this important detail.

Immediately after withdrawal of morphine, and for a period of several weeks, the individual is nervous, troubled with insomnia, and in a condition wherein he is torn between conflicting emotions; he is impulsive, lacks self-control, and if not restrained may suddenly disappear. For these reasons Carlisle insists upon a ward residence of from one to two weeks.

Improvement in general bodily health is from now on surprisingly rapid, and in a few weeks under tonic treatment, regulated daily routine, proper diet, and out-of-door exercise, the insomnia, which is often troublesome during early convalescence, rapidly improves, and the patient appears and acts more like a normal individual. He is now given the opportunity and assistance to build up his resistive powers, strengthen his will and self-control, and readjust his mental attitude toward the use of drugs. A spirit of coöperation should exist between himself and his adviser, who should have his entire confidence.

Following a residence of from six to twelve weeks the individual may now leave the hospital with some assurance of success.

THE TREATMENT OF ACUTE POLIOMYELITIS.

In the *American Journal of the Medical Sciences* for February, 1917, LE BOUTILLIER points out that while many drugs have been advocated and used there seems to be none which give marked results. Hexamethylenamin was used in all cases during the first two and a half months of the epidemic without apparent result, and was then discontinued. Tincture of nux vomica was used in many cases after the first week for its general tonic action without any bad effect, while in some cases the general condition of the patient improved. During the third and fourth week syrup of iodide of iron was used in a number of anemic children, with good result.

Lumbar puncture as a therapeutic meas-

ure must not be overlooked, as it is the one procedure from which is derived the greatest benefit. It should be done as often as the condition of the patient indicates; that is to say, from every twelve to every twenty-four hours in some cases; every three or four days in others, or only when increased pain and restlessness or irritability point to pressure by an increased amount of spinal fluid. By removing the pressure upon the congested portions of the cord this writer has seen cases recover from an apparent absolute paralysis of one or more extremities, which, of course, means there was only congestion and that the disease had not attacked or destroyed the nerve tracts. In other cases almost instant relief of pain followed lumbar puncture.

Adrenalin chloride in 1-to-1000 solution given intraspinally theoretically should be of great value because of its action upon the congested blood-vessels of the membranes and cord. Its use in doses of from 1 to 2 Cc. every six hours for several days has been advocated. This, however, Le Boutillier found caused marked disturbance, with vomiting in many cases, and every twelve to twenty-four hours was substituted. The results obtained were rather questionable, as it seemed impossible for the solution to reach the upper part of the cord if the seat of the lesion was high, even with the buttocks well elevated. This method of treatment, however, should not be given up until one showing decidedly better effect be discovered.

Normal human serum—that is, serum collected from healthy adults—was used in a few cases, but without result.

Immune serum, or that obtained from the blood of persons having suffered from acute poliomyelitis some months or years before, was used to as great an extent as possible. He was, however, handicapped by the comparatively small amount available, and by the fact that at first it was reserved for use in only the most desperate cases. Later on it was given to patients entering on the first or second day of the acute paralytic stage, and here some good resulted. It was given in doses ranging from 5 to 15 or even 30 Cc., either intraspinally, intravenously, or intramuscularly, daily or every two or three days, for several doses. At times a combination of adrenalin chloride in the morning and immune serum at night was used on consecutive days, with apparently better results than when given alone. In at least two very severe cases with chest involvement the improvement following this method of treatment was most marked. When, however, a severe toxemia is present, showing a marked general involvement, the intravenous use of the serum is especially indicated. When paralysis alone occurs the intraspinal method of administration seems to be most effective. The intramuscular method, he believes, should only be employed when it is impossible to give the serum into a vein, as the absorption is much slower. Another method of procedure when the toxemia is marked is the intravenous use of hypertonic salt solution, following the removal of an equal or smaller quantity of blood; the quantity removed varying from 5 to 30 Cc., depending upon the age and condition of the patient.

THE THERAPEUTICS OF OLIVE OIL.

In the *New York Medical Journal* of February 3, 1917, Asnis claims that olive oil not only reduces the acid content and overcomes pylorospasm, but in addition possesses decided advantages over silver nitrate, belladonna, bismuth, etc. Its action is local and not general as in the case of belladonna, nor does it tend to constipate like bismuth salts, nor does it threaten with unpleasant sequelæ as in the prolonged use of silver nitrate.

It is well to bear in mind the action of a fissure or an acute ulcer of the stomach upon the glandular structure and the pyloric sphincter, and the reaction of the pylorus and the hyperacid gastric juice upon the ulcer. The ulcer is kept active by the hyperacid juice and the spasmodic contraction of the pylorus, which in turn are kept active by the irritation of the ulcer.

Olive oil not only inhibits the gastric

secretion, but also relieves pylorospasm, and incidentally acts as a protective covering over the injured mucous membrane.

The action of the oil is also enhanced, inasmuch as it remains in the stomach for a longer period than any other drug. As already mentioned, its laxative and nutrient properties become valuable in instances where such results are most desirable.

While olive oil is equally as efficient if not superior to any other form of medical treatment in the diseases mentioned, it is, however, contraindicated in other diseases of the stomach, such as dilatations, subacidity, and achylia.

STUDIES OF EYE-GROUND CHANGES IN CEREBRAL SPASTIC PARALYSIS.

KEARNEY in the *New York Medical Journal* of February 3, 1917, states that every child whose delivery has been difficult or instrumental should have its eye grounds examined by competent observers directly following its birth, whether convulsions occur or not. If pressure signs are determined in the fundus of the eye and confirmed by the measurement of the cerebrospinal fluid on lumbar puncture, a decompression operation removing the hemorrhagic clot as soon as possible would greatly lessen the lamentable condition which results from neglect of this procedure.

A CONTRIBUTION TO THE PHARMACOLOGY OF STOVAINE.

In the *Journal of Pharmacology and Experimental Therapeutics* for January, 1917, H. I. SMITH reaches these conclusions:

1. Their experiments afford no evidence that stovaine exerts any direct action on the blood-vessels after the intravenous injection in cats, and it failed to change the caliber of the renal vessels of the cat or dog when perfused in concentrations of 1:10,000 to 1:2500. It depresses the heart when toxic doses are injected intravenously, and when the rabbit's heart is perfused with a solution containing 1 part of the drug in 10,000 parts of Locke's solution.

2. Stovaine causes death by inducing immediate and simultaneous paralysis of the heart and respiration, the action on each being independent of that on the other.

3. Stovaine disappears rapidly from the blood stream after its intravenous injection.

4. Little, or none, of the drug is excreted unchanged in the urine of the cat.

5. Stovaine is removed from perfused fluid by the liver, in which it appears to be destroyed.

6. The fatal dose of stovaine for the cat or rabbit is about 30 mgm. per kilogramme when a solution of 1:100 is injected rapidly into a vein. Somewhat more is required when dilute solutions are used. Complete recovery follows the injection of a toxic, but not fatal, dose within a short time, and several times as much as a single fatal dose may be administered within a few hours if small portions be given at short intervals. Very large doses are required by subcutaneous injection to cause death.

7. Stovaine is slightly, but distinctly, more toxic than novocaine by similar modes of administration, and complete recovery does not follow the administration of toxic doses of stovaine so promptly as it does that of corresponding doses of novocaine.

THE TREATMENT OF DELIRIUM TREMENS.

LIND in the *New York Medical Journal* of February 3, 1917, points out that in delirium tremens we have an acutely excited patient who is suffering from exhaustion and toxemia. We have then three things to treat: the excitement, the exhaustion, and the toxemia. This is done by sedatives, overfeeding, and elimination.

It is extremely important to have a trained nurse constantly in attendance who is experienced in such cases, and is tactful in dealing with the patient's whims and in persuading him to take nourishment and medication. When the patient comes under treatment stop the alcohol entirely and give four compound cathartic pills. These are

not repeated, but a Seidlitz powder is given every morning until the patient is convalescent. Hydrotherapy is triply effective: it subdues the excitement, relieves the exhaustion, and promotes elimination. Give a hot-air bath until the patient perspires freely, then place him in a hot pack. This is given by wrapping him completely except the head in sheets which have been wrung out in water at 105° F. Over these are wrapped blankets, which are pinned tightly, and an ice-cap is applied to the head. The patient remains in this pack from half an hour to an hour, is then taken out, and given a brisk rubbing with a dry towel. These packs may be repeated several times during the day. At about six in the evening of the first day of treatment the following prescription is given:

Veronal,
Sulfonal,
Trional, āā gr. v.

M. et ft. chart. No. 1. Sig.: To be taken in half a glass of warm milk.

At 7 P.M. he is put in a warm bath, where he remains until 9. At 8 P.M., while in the bath, he is given one tablespoonful of the following prescription:

Paraldehydi,
Glycerini,
Spiritus aurantii compositi, āā fl.℥iv;
Aquæ, q. s. ad fl.℥ij.

At 9 o'clock he will ordinarily be very sleepy and should be allowed to sleep undisturbed until morning. There is no harm in inducing sleep by light hypnosis or by suggestion. If the patient becomes excited during the night the following may be given hypodermically: Morphine sulphate, grain 1/8; hyoscine hydrobromide, grain 1/100; and strychnine sulphate, grain 1/60. If it is necessary to give this hypodermic, do not repeat it during the treatment.

During the treatment the patient should take as much nourishment as possible. As there will usually be a disgust or an absolute refusal of food, this should be appetizing in appearance and taste, of small bulk, and easily assimilable. Egg beaten up in milk, orange or grape juice, albumen, chicken or beef broth highly seasoned, and rice cooked in milk may be given.

Whenever the patient is seen by the doctor the heart should be carefully examined, and there should be no hesitation in using stimulants, for the battle is won or lost within a few days. Strychnine, caffeine, camphor, and digitalis are the stimulants of choice. Collapse may often be successfully combated by infusion or enteroclysis of normal saline solution.

Following the deep sleep which marks the turn of the tide in the patient's favor there is the period of convalescence, when he is subjected to a building-up process. Drugs are withdrawn as far as possible, although an iron and arsenic combination may be beneficial. The diet is increased gradually, exercise in the open air is instituted, and the patient encouraged to take a hot bath at night and a cold one in the morning. It is at this time, too, if ever, that something may be done for the chronic alcoholic. A brief analysis of the causes of his alcoholism should be made, and they should be explained to him in his own terms. He should be told that the solution of the problem was in his own hands and encouraged to attempt it.

TREATMENT OF ACIDOSIS.

ROWNTREE in the *Saint Paul Medical Journal* for January, 1917, states that alkali treatment is always indicated in acidosis, because a diminution in bicarbonate reserve, as pointed out by J. J. Henderson, is an invariable accompaniment of acidosis regardless of other coexisting changes. The degree of acidosis should be determined preliminary to the administration of alkali, since the degree of acidosis controls the intensity of treatment. The more severe the acidosis the more alkali is indicated. Alkali should be administered at least until the pH of the blood returns to normal. It is desirable perhaps to correct the alveolar CO_2 and alkali reserve as well, although this is not always so readily accomplished.

When the treatment is intensive alkalosis

results, a condition but little studied and little understood.

The usual clinical effects of alkaline treatment are relief of dyspnea, diuresis, with occasionally mental improvement. With lethal amounts of alkali coarse tremors and rigidity develop, and finally vomiting, convulsions, and relaxation of the sphincters. Rigor mortis is immediate and extreme.

Clinically at times edema and ascites develop during alkali administration. Aside from alkali therapy alkalosis is rarely encountered. Levy and the writer have found it only in the following conditions: typhoid, following transfusion in primary and secondary anemia, and in nephritis. Wilson and Stearns demonstrated its presence in experimentally induced tetany in dogs.

At the present time it must be admitted that our knowledge of acidosis is not profound. Relatively simple methods of determining its existence and intensity are now available—the same methods serving for the control of therapy. Through their use a deeper understanding of acidosis must result. More exact, and therefore more effective, treatment can be confidently anticipated.

THE USE OF PITUITARY EXTRACT IN POSTABORTION CURETTAGE.

In an editorial note in the *Medical Record* of December 2, 1916, mention was made of this use of pituitrin, and the statement was ventured that it was first proposed by a writer in *Surgery, Gynecology and Obstetrics* for September, 1916. We have learned that this was an error, as Dr. Jacob L. Bubis, of Cleveland, in a paper read before the Gynecological Section of the New York Academy of Medicine on November 23, 1915 (*American Journal of Obstetrics,* No. 4, 1916), reported three cases in which this measure was resorted to with success. The advantage of giving pituitary extract in these cases he summarized as follows: (1) Preliminary packing of the cervix and vagina to induce softening of the cervix and stimulate uterine contractions is usually unnecessary. (2) No packing is placed in the cervix or vagina after emptying the uterus. (3) The injection of pituitrin is given after the cervix has been dilated, while the patient is under an anesthetic. (4) Very little blood is lost while removing the placenta piecemeal. (5) The uterine cavity decreases in size as rapidly as its contents are removed. (6) No hot irrigations are necessary. (7) The total operation takes only a few minutes.—*Medical Record,* January 27, 1917.

ORTHOPEDIC METHODS IN MILITARY SURGERY.

AITKEN (*Lancet,* Jan. 6, 1917) states that we have long known that a shoulder ankylosed with the arm by the side leads to a very useless limb, while if ankylosed with arm abducted, in such a position that with the elbow flexed the fingers come easily to the mouth, the mobility of the scapula is developed so as to make up for the loss of the shoulder-joint. Hence, after ankylosis of the shoulder in useless position a cuneiform osteotomy of the humerus is desirable, with the arm dressed in abduction so as to secure union in the useful position.

In children full abduction is permissible, for in two or three years they develop an extraordinary compensatory mobility of the scapula. In adults the arm should be raised to rather less than a right angle, otherwise the elbow may not come quite down to the side when the scapula is dropped, and the patient goes about as if he were offering his arm to a partner for dinner, which might be embarrassing.

Aitken's remarks in regard to injuries about the elbow-joint are illuminating. In 1897-98, when a dresser in the surgical wards in Edinburgh, the writer was taught that every injury about the elbow, except fracture of the olecranon, should be treated in the fully flexed position. This doctrine has been introduced by Caird and Cathcart, who have brought it from Liverpool. The second part of the Liverpool teaching, however, has escaped the Edinburgh teachers, and he looks back with horror on the in-

dustry with which he performed daily passive movements on an unfortunate child with a split fracture of the condyles of the humerus, with the inevitable result that the joint became more painful and more stiff.

Three years later, when he became house surgeon to Robert Jones in Liverpool, he was taught the doctrine of rest—that is, that having flexed an injured elbow it must be left alone for three weeks or more till all tenderness about the joint had disappeared. Then, and not till then, the sling may be slackened a few inches; if, two days later, the patient can move the hand through those few inches, the sling may be further slackened. If, however, the elbow becomes stiff in the new position, it must be again flexed and left to rest for another week or more before again testing it for mobility.

When in 1907 the writer walked round London hospitals, when he was a candidate for the Fellowship examinations, he was surprised and horrified to find that the internal right-angled splint was being recommended for injuries of the elbow. He is still more horrified to find it in use to-day. He knows of no injury about the elbow in which the internal right-angled splint can be regarded as a proper splint.

For this strong and sweeping statement there are two good reasons. The first is that the prominent internal epicondyle is pushed outward, and the line of the elbow-joint is distorted if the fracture is through or above the condyles; the second is that even if the epicondyle be to some extent accommodated in a hole in the splint, the forearm is fixed half-way between supination and pronation, with the palm of the hand against the splint.

The author lays it down as a standing rule that in all injuries of the arm and elbow, and most of the forearm, the forearm must be supinated and the palm of the hand must be directed toward the face. If this is neglected there will be an error in the carrying angle of the elbow, or there will be limitation of the supination in the forearm, a very serious disability of which the author has seen dozens of examples sent to the Military Orthopedic Hospital. It is not always easy or possible to attain this, but he is certain that many surgeons are not consciously and deliberately trying to secure full supination in the early stages of treatment. In injuries of the wrist stiffness in a flexed position is the fault to be avoided, and dorsiflexion is the first preliminary to any treatment. It is a waste of time to attempt massage until the wrist has been dorsiflexed.

In the lower limb the problem of restoration of function is often much more simple than in the upper limb. With a disability which precludes walking any arrangement which makes the patient independent of crutches is a boon. Aitken states that in his hospital for crippled children there is not a single pair of crutches. This because if a child is allowed to swing along on crutches he will not bother to use his limb properly, and the same is true of the soldier. He pictures various splints, as for extending stiff flexed knees when the stiffness is due to fibrous deposit in and about the joint and muscles. This is a flexion splint useful for flexing stiff knees where there has been fracture of the femur, and the vasti and rectus muscles are matted together and to the bone in one solid mass of fibrous infiltration. The splint is applied and the limb very slowly flexed for some days. Then the splint is removed and the limb is allowed to straighten. Then the process is repeated, each time carrying the flexion about 5 to 10 degrees farther than on the former occasion; and so on for three to five months, until there is some regeneration of muscles. After this massage and exercise carry the process farther. It is only applicable to old cases with dense fibrosis.

As to the method of dealing with troublesome deformities arising from trench foot, they follow the well-known routine lines of treatment of the acuter forms of flatfoot, such as may follow an infective periarthritis, a crush, or the idiopathic forms sometimes seen. In the early stage, when the foot is too tender to touch, the patient is rested in bed absolutely, is massaged

daily, and the shape of the feet gradually corrected with some suitable form of splint according to the deformity. When not too tender to be handled, though still too tender for the patient to stand on, the foot is molded more firmly into correct shape in plaster-of-Paris bandages, and molded by the surgeon's hands while the plaster is setting. Later the patient is able to get about in a walking plaster.

The methods of twisting and molding a foot by means of plaster bandages are simply an application of familiar methods of correcting clubfoot in infants, either with bandages or with sticking-plaster. It is only an application to plaster bandages of methods in every-day use by surgeons who are accustomed to employ the direction and tension of their bandages for purposes of correcting or checking deformities.

THE HARVARD INFANTILE PARALYSIS COMMISSION AND ITS WORK IN MASSACHUSETTS.

LOVETT (*Boston Medical and Surgical Journal*, Jan. 11, 1917) after describing the organization and the activities of the commission deals only with one of the three branches of activity, namely, the after care of paralyzed children.

Infantile paralysis causes a motor impairment which in many cases limits normal activity and in others causes serious and lasting disability. The critical time is not in the first two or three months after the attack, but in the subsequent months up to the end of the second year, during which period the question of ultimate function in most cases is determined by the treatment received. Certain cases are so lightly affected that they will recover no matter what treatment is pursued, others are so severely paralyzed that no treatment is of much avail, but in the majority of cases treatment at this time has great effect on the final amount of restoration of power.

Neglect or ineffectual treatment during this time means unnecessary crippling and disability to so large a number of children that it is an economic blunder to allow it to happen, aside from any humanitarian aspect that the matter may have.

The State care of infantile paralysis was instituted in Vermont in January, 1915, and is still in force there. It was begun by the State of New York (exclusive of New York City) in October, 1916, and by Massachusetts, where the epidemic began later, in November, 1916. Various cities have established clinics for the care of these cases, and various other communities have under consideration schemes of public care. The situation is too serious to be met by the ordinary agencies of relief.

The treatment of the acute stage of poliomyelitis is effectively and thoroughly carried out in a modern way by the practitioners of Vermont, New York, and Massachusetts, the States of which the author has first-hand information. The later operative treatment of the disease is, on the whole, also modern, efficient, and surgically sound as carried out by the competent orthopedic surgeons of the United States. The treatment of the convalescent stage of the disease (from the disappearance of the tenderness until two years after the outset) is practically about what it was thirty-five years ago, not having changed as has the treatment of the early and late stages. Massage, electricity, and braces are the methods of treatment most in vogue in the United States to-day during this stage.

The essentials of a modern treatment of this stage are, first, an accurate diagnosis, which can be made only by a careful examination of every available muscle or muscle group in both arms, both legs, back, neck, and abdomen. This is a perfectly obvious requirement for accurate treatment. It takes time, care, anatomical knowledge, and skill. Second, the aim of treatment should be the development of affected muscles to their highest ultimate efficiency. The Vermont figures have shown that partial paralysis is nine times as common as total, when muscles are carefully examined individually. The affection is not, therefore, so often a hopeless loss of power as a muscular weakening. This lays stress on muscular development as the key-note of

treatment. Third, the use of braces is conservative and protective rather than therapeutic, and the "brace treatment" of this stage does not exist any more than does a "crutch treatment" of fracture of the leg. Braces must be used in many cases to enable patients to go about, to prevent muscular stretching and joint loosening, and to avoid deformity, but they constrict the muscles, they prevent normal use of the limb, and they are heavy. They should be worn during the first year only for walking, and removed when the small amount of walking safe at this time has been done.

Fourth, fatigue is detrimental, easily induced, and delays muscular recovery. The power of weak muscles may be permanently destroyed by overuse, and unprotected overuse may result in muscular stretching and permanent deformity. The overuse of massage and therapeutic exercise is capable of inducing harmful degrees of fatigue. The physician who allows unrestricted walking with or without a brace in the first year takes on a heavy responsibility.

Fifth, massage is useful in proper dosage in preserving muscular tone, promoting circulation, and preventing muscular atrophy. Its overuse is dangerous.

Sixth, electricity with mild currents does no harm and perhaps does good, but is not a powerful remedy, and its benefit has been denied by some writers. It has done much harm by being used over long periods of time, often none too carefully, during which no other treatment has been pursued, and the parents have been deluded into the belief that proper treatment was being given, while valuable time was being lost and permanent deformity being acquired.

Seventh, muscle development by muscle training is the important part of the modern treatment. Loosely given, it is harmful, because a child will inevitably use strong rather than weak muscles in a loosely formulated movement, and the person prescribing such exercises must have a sufficient knowledge of functional anatomy to formulate exercises calling only on the weak muscles. This knowledge is not as a rule possessed by the ordinary masseuse. Therein lies the chief obstacle to the general use of the method, the scarcity of persons sufficiently trained to prescribe proper exercises, and the formulation of such muscular exercises by persons not specially trained to give them effectively.

To embody these requirements in a practical scheme the following plan has been adopted by the commission:

Clinics are held in Boston and in other parts of the State where physicians may bring their patients for examination and free consultation. These clinics are so arranged that each patient receives as much time as is necessary for the thorough examination of the case, and the formulation of treatment. Specially trained women are to serve in Boston and other parts of the State to assist the family physicians, if they wish it; in carrying out muscle training at home, in seeing that apparatus is worn if ordered, that fatigue is avoided, that the physician's directions are followed, and that the patients do not fall into the hands of fakirs.

So far as possible each family is enlisted in the responsibility of the case. When she is intelligent, the muscle training is taught to the mother and supervised by the nurse. Coöperation has been arranged with the District Nursing Association and other similar organizations whereby the follow-up work is distributed and the care assisted by them under the technical supervision of the commission's nurses.

The patients are instructed to return to the clinics at intervals suited to the individual case, but it is intended to make the home care the main feature of the scheme, and this plan is intended to cover a sufficient number of years to obtain final results.

It is desired to work only through the family physician, to assist and not to supersede him, and to furnish him with the record of each case and suggestions for treatment whether or not he is present at the clinics.

The central clinic of the commission is held at the Children's Hospital on Tuesdays, Thursdays, and Saturdays at nine

o'clock. With this clinic coöperates the Orthopedic Clinic of the Massachusetts General Hospital, held each morning at nine o'clock. To the latter clinic are referred all adult cases and patients from the north and west ends, East Boston, and Charlestown.

For groups of cases who cannot easily come to Boston, the Children's Clinic unit will be transported direct to such centers in the States as desire to have it, at the direction of the Commissioner of Health. Such clinics in out-of-town centers will be repeated at sufficient intervals to afford proper follow-up care. In these outside centers, just as in Boston, trained women will be assigned to the supervision of the treatment of such cases under the direction of the family physician. The service of the outside clinics and of the follow-up care is without charge. It is not the intention of the commission to attempt to establish clinics in any locality maintaining private clinics for the purpose.

The aim of the commission is to furnish to those physicians who wish it assistance in carrying out the modern treatment of infantile paralysis with the hope that by so doing the whole standard of treatment may be raised and that Massachusetts may hold as prominent a place in the therapeutic side of this disease as it already holds as a pioneer in the study of its etiology. For this purpose funds must be contributed, and it would be desirable if, so far as possible, independent schemes of relief might be correlated to the main enterprise.

GUNSHOT WOUNDS OF THE HEAD.

In an editorial in the *British Medical Journal* of December 2, 1916, commenting on a paper by Lieutenant-Colonels P. SARGENT and GORDON HOLMES, it is observed of the 1239 cases of gunshot wounds of the head admitted to eight hospitals in London, the records of which were examined, 46, or 3.7 per cent, died. This figure includes a certain number of serious and hopeless cases evacuated to England from the base hospitals in France as quickly as possible, on whom no operation was performed, or in whom exploration showed that there was no reasonable prospect of recovery. Nine such cases died within two weeks of their arrival at home, and in the majority of the others death occurred within three months. Only five patients are known to have succumbed after this period. In almost all instances spread of septic infection was the cause of death.

Thirty-four of the forty-six fatal cases had been operated upon before their evacuation to England; in six no operation had been performed; and in the six others definite information on the point could not be obtained. The reporters distinctly state that they have traced and have heard of no case in which death occurred in England when the dura mater had not been lacerated by the wound, and had not been opened by operation.

It is, they say, now generally recognized that much of the paralysis, sensory and visual disturbances, and other symptoms seen in the early stages, are due, not to local destruction of the brain, but to concussion, edema, and vascular disturbances that often extend widely beyond the primary injury. Allowing for this, they state that they are yet, on the whole, surprised at the amount of improvement that has occurred. A small proportion of men with penetrating and perforating wounds of the skull originally seen with paralysis, sensory disturbances, hemianopia, and other symptoms, had already returned to active service, and others were employed in wage-earning capacities. The amelioration of symptoms was especially striking in many of the cases of hemiplegia, diplegia, or quadriplegia due to injury of the superior longitudinal sinus. As improvement is generally slow and continuous over long periods, it is to be expected that a considerable proportion of men with even severe head injuries will be able to lead useful and active lives.

Though during the early stages after the infliction of the wound many patients present symptoms of some degree of mental deterioration, especially dulness, loss of memory, irritability, and childishness, the

records tend to show that in the majority of cases these symptoms disappear or diminish. Cases of mental disturbance or actual insanity necessitating confinement under certificate were found to be surprisingly rare.

With regard to epilepsy, the results of the investigation were equally reassuring. Among the 610 cases of which complete notes were obtained, fits had occurred after evacuation to England in thirty-seven, or 6 per cent; but in eight only one convulsion had occurred, and in only eleven were the convulsions frequent. In a considerable proportion of the cases only one or two seizures occurred after arrival in England, and in several of the others they were arrested by the administration of bromide, and it is suggested that it is advisable to give bromide regularly to all serious cranial injuries until the wound is healed, and for some months afterward. In five of the cases secondary operations were performed with good results; in two small abscesses were drained; and in three spicules of bone were removed. Among the cases invalided out of the army various forms and degrees of paralysis, sensory and visual disturbances, and other symptoms due to the primary cerebral injury or to further damage to the brain by septic infection, hernia formation, or in the course of treatment, were common. Various subjective symptoms which could not be attributed to local injury were also remarkably frequent; the most common was headache, increased by noise, fatigue, exertion, or emotion, as well as attacks of dizziness, nervousness, and deficient control over the emotions and feelings. Many exhibited a change of temperament, becoming depressed, moody, irritable, or emotional, and unable to concentrate attention on any physical or mental work. In a few there were major hysterical symptoms, such as paralysis, anesthesia, or visual disturbances. The symptoms were very similar to those seen in neurasthenia, especially of traumatic origin, and although they incapacitated the subject from active service were not irrecoverable. They were entirely independent of the site or severity of the original wound, were often as severe when the scalp had been injured as in a serious compound fracture of the skull, and seemed to develop equally whether an operation had been performed or not.

Of the cases evacuated to England with cerebral hernia death occurred in 24.16 per cent. Of cases in which bullets, shrapnel balls, or fragments of metal were lodged in the brain, ninety-seven were traced; the foreign body had been removed before transference to England in twenty-seven instances, but in many of them the bullet or piece of metal was only just inside the skull, and was removed along with the fragments of bone. Of these, three died, all within three months; others were alive at varying periods up to twelve months after the infliction of the wound. The fate of sixty-nine cases sent to England with the missile still in the brain was traced; in all the foreign body was at some considerable distance from its point of entry; a few were rifle bullets and a few shrapnel balls, but the great majority were smaller or larger fragments of shell, often multiple and inaccessible, yet only four died. Of these four, two were sent home in what appeared to be a hopeless condition, and both died within two months; one died six weeks after an unsuccessful attempt to remove a bullet which lay close to the falx cerebri, and the fourth died from rupture of a cerebral aneurism, the fatal issue being wholly unconnected with the continued presence of the missile. Of the sixty-five surviving cases, twelve had been wounded less than three months before they were inspected, twenty-five between three and six months, twenty-one between six and twelve months, and seven over a year. In 76 per cent the wounds were soundly and completely healed, and in 30 per cent complete recovery had occurred, and no symptoms of cerebral lesion were present. In 40 per cent the neurological symptoms had improved to a remarkable extent; in 10.5 per cent much disability (hemiplegia, hemianopia, neurasthenia, etc.) persisted, but its existence depended on the damage done

by the missile in its course, and not on its presence. Fits were observed in only four cases, and in two of these they occurred early and were transient.

Among the 610 cases of which complete records were obtained, fifty-three were submitted to operations in England; in thirteen of these the operation was clearly of a trivial character, consisting merely in the removal of sequestra from an unhealed wound; twelve were for intracerebral abscess, and ten of these recovered, a remarkable result in view of the very much higher rate of mortality in cerebral abscess of otitic origin. In three cases in which an operation was performed for the removal of a projectile, one proved unsuccessful and the patient died; another was also unsuccessful, but the patient did not die; and the third was successful and the patient recovered. In three cases a cerebral hernia was shaved off, and two of them died of meningitis. The third, although cerebrospinal fluid escaped from time to time after the operation, survived, but he still had a hernia cerebri.

In summing up the results of their investigation the authors say that the later results of head wounds seem to be much more satisfactory than had been generally expected. Later complications, such as cerebral abscess, are relatively rare, and serious sequelæ, such as insanity and epilepsy, much less common than had been foretold, but they recognize that this conclusion is subject to the qualification that in only 15 per cent of the cases had it been possible to learn their condition after more than one year. Still, as they say, even such facts as are available are a safer guide to treatment than opinions based merely on *a priori* reasoning.

Another conclusion they draw is that there are no grounds for supposing that more radical operations abroad are called for. "It seems," they say, "extremely doubtful if surgical intervention other than that necessary for the drainage and healing of the wounds diminishes appreciably the risk of later complications, or can modify, except in a harmful direction, the course of these cases from the functional standpoint. Every possible step should, however, be taken to prevent the development of a hernia cerebri." Their records show also that many patients with foreign bodies lodged deeply in the brain recover, and are scarcely more liable to serious complications than men in whom the brain has been merely exposed and lacerated. Any attempt to remove such foreign bodies which may involve spread of infection or further destruction of brain tissue is consequently inadvisable.

PRESENT STATUS OF THE TREATMENT OF BLADDER TUMORS.

GERAGHTY (*West Virginia Medical Journal*, December, 1916) divides tumors into papilloma—benign and malignant; papillary carcinoma; and in a separate class he places the adenocarcinoma, squamous and scirrhus carcinoma. This because the handling of papillary carcinoma requires a technique very much more developed than is necessary for the handling of the other carcinomas.

In malignant papilloma there are present principally changes in the shape, staining properties, and nuclei of the epithelial cells without any marked evidence of cancerous infiltration. Experience, however, has shown that these changes are indicative of cancer and that patients die of cancerous metastases when these changes in the papillæ are the only evidence of malignancy which exists. In a series of twenty-five papillomata examined histologically 68 per cent showed the changes characteristic of malignant papillomata. When, however, the malignant papilloma has advanced to the point where infiltration of the bladder wall occurs we apply to it the term papillary carcinoma. This differentiation is arbitrary and is simply one utilized as a working basis.

As a differentiation between malignant papilloma and papillary carcinoma, cystoscopy, combined with other clinical methods, is of greater aid than the histological picture alone. Finding on cystoscopic ex-

amination the presence of necrotic papillæ on an otherwise benign looking papilloma, the presence of edema around the margin of the tumor or nodules in the mucous membrane in the neighborhood of the tumor, the presence of an intractable cystitis, and when tumors are situated on the posterior bladder wall, feeling on rectal examination the slightest induration in the bladder, are points in the differential diagnosis which have served best. It must be admitted that none of these conditions may be present and the tumor may still have invaded the bladder wall. When in doubt concerning the nature of the tumor fulguration may be adopted as the therapeutic test. After a few applications of the fulguration current it can usually be determined whether the tumor is one suitable for this form of treatment. When the surface of the tumor is vigorously fulgurated and the slough does not separate, or when it becomes covered with calcareous deposit, this is evidence of advanced malignant changes in the deeper portions of the tumor.

Fulguration has been employed in fifty-three cases; in twelve the tumors were inoperable carcinomata and fulguration was employed as a palliative measure or to test out the efficiency of this treatment in that type of case. In none of these cases was any marked impression made upon the tumor, while the treatment was rather painful in the scirrhus type. In forty-one cases with papillomata, in 34 per cent of whom the tumors were multiple, three cases ceased treatment before the tumors had disappeared. In two cases, although the tumors were small and apparently papillomata, the response to fulguration soon indicated that they were really papillary carcinoma. In one of these a successful resection was subsequently performed; while the other case, a very elderly man, developed a senile dysentery and auricular fibrillation, of which he shortly afterward died. In the remaining thirty-six cases the tumors in every instance entirely disappeared. There seems to be quite a marked difference in the promptness of response to fulguration between the benign and the malignant papillomata. The typical benign papillomata disappeared with astonishing rapidity; on the other hand malignant papillomata disappeared slowly, and frequently required many times the amount of treatment which would be necessary for the benign papillomata of the same size. In one instance it required almost nine months to completely remove a malignant papilloma which covered the whole left lateral wall and which was composed probably of not one tumor but of multiple papillomata fused on the surface, giving the appearance of one broad extensive tumor. In this instance this form of treatment was continued because of the definite and progressive decrease in the size of the tumor and the rapid separation of the burned areas after each treatment. Of twenty-five papillomata examined histologically, seventeen showed the changes characteristic of malignant papilloma, but all of them were removed by fulguration, the benign and malignant differing from each other only in that the response was slower in the malignant types. The incontestable proof that at least some of these tumors were malignant or cancerous is that two of them subsequently died of cancerous metastases, although the bladder was free from tumor.

Of the thirty-eight patients in whom fulguration was successful in removing the original tumor or tumors, recurrences are known to have occurred in seven cases. In all of these, with one exception, the recurrence was present in less than a year. In one patient recurrences are observed every few months, although it has been over three years since the original tumor was destroyed. This tendency to recurrence seems as active to-day as it was during the first year. The recurring tumors with one exception have all responded to fulguration, like the original tumor. The one exception is of extreme interest (Roeder). This patient had a papillary tumor several centimeters in diameter just back of the ureteral orifice which disappeared fairly rapidly under a combination of radium and fulguration. For several months after the

disappearance of the tumor the mucous membrane of the tumor-bearing area seemed entirely healthy. Shortly afterward, however, cystoscopic examination showed a peculiar reddening and some slight bulging of the mucous membrane without any ulceration or definite tumor formation. This was at first thought to be a localized inflammatory area. The process, however, seemed to spread, and a piece removed with the cystoscopic rongeur showed the patient to have an infiltrating carcinoma of the bladder wall with the mucous membrane on the surface practically intact. This is undoubtedly a case in which cancer cells from a malignant papilloma have metastasized into the deep bladder wall and there continued to grow after the tumor mass had been entirely removed. A malignant tumor of this type has been studied histologically by Burger. Patients with multiple tumors seem more apt to have recurrences than those in whom only one tumor is present. While it is too early to draw definite conclusions regarding the percentage of cases that will remain permanently cured, the results to date would seem to warrant us in believing that a not inconsiderable per cent will be free, because the tendency for recurrence grows progressively less after the first year.

The failure of excision to cure more than a very small per cent of bladder tumors, whether benign or malignant, led surgeons to adopt more radical measures, so that during recent years resection for all tumors, namely, the complete removal of the tumor-bearing area together with all the coats of the bladder wall, has been the procedure advocated.

Experience has shown that when the growth has infiltrated the bladder wall, resection with as wide a margin of healthy mucous membrane as seems necessary is the only method which offers much hope of success. Resection is indicated when the tumor is of such a size that it can be completely removed even though it necessitates the transplantation of one or other ureter. It is quite generally conceded that resection should not be undertaken when the tumor has infiltrated close to the vesical orifice, and particularly when it has invaded the prostate. It is also questionable whether resection should be performed when the tumor is so extensive that transplantation of both ureters will be necessary. When the tumors are multiple resection again is contraindicated unless the tumors occupy an area which will allow their removal in one piece. Tumors occupying the anterior bladder wall are the ones most favorable for resection. The transperitoneal method except in occasional cases is not to be recommended, as a sufficiently perfect exposure can be secured without exposing the patient to this unnecessary risk.

The position and size of the tumor should be determined as accurately as possible before operation by means of cystoscopy. The bladder should be emptied and filled with air, so that when the bladder is subsequently opened the infected fluid may not soil the incised tissues. Immediately on opening the bladder, which should be done in such a way as to avoid trauma to the tumor, the tumor should be thoroughly cauterized *in situ* before any further manipulations are carried out. In order to avoid sponging a glass tube connected with a suction pump should be placed in the base of the bladder, but not allowed to come in contact with the tumor. If sponging becomes necessary, sponges wet with alcohol should be used, and the sponges which come in contact with the tumor-bearing area should not be applied to other portions of the bladder wall. The main emphasis should be laid on the thorough destruction of the tumor by the cautery before resection is attempted. This having been done, the bladder wall can be incised with the cautery or knife with less danger of implanting tumor cells. Resection has been the operation carried out in twenty-four cases, and nine of these cases were well two years or longer after the operation. Of these nine cases five of the tumors belong to the malignant papilloma type, and four were small circumscribed papillary carcinoma in which it was possible to remove a considerable margin of normal bladder wall. In none of the

carcinomas extensively invading the bladder wall has a cure been obtained.

During the past eighteen months about fifteen tumors have been treated with radium alone or with radium in combination with fulguration. Experience has not been sufficient to draw any definite conclusions regarding the ultimate value of this method. It has been employed most frequently on malignant papillomata in combination with fulguration, and the effect of the radium in these cases has been most striking. In three cases in which fulguration had been employed over long periods of time, and in which the lesions had resisted very stubbornly all efforts to entirely destroy them, the application of radium to the tumors seemed entirely to change their nature. In all three cases after receiving 500 to 600 mg. hours of radium applied directly against the tumor, the tumor disappeared with astonishing rapidity on resuming fulguration. When possible the radium is applied directly against the tumor by means of the Young Radium Cystoscope, using a tube with an opening on one side so that the beta rays can be applied directly to the tumor while the rest of the bladder wall is screened. The combination of radium and fulguration in this type of case seems to promise much. So far it has not succeeded in definitely eradicating the papillary or other infiltrating types of carcinoma.

TREATMENT OF PRURITUS ANI.

MURRAY (*Proctologist and Gastroenterologist*, December, 1916) finds streptococcus fecalis cultures in 94 per cent of these cases. The local pathology he regards as a coincidence which has nothing to do with the primary etiology of pruritus. Moisture of the anal skin he considers as due to the low-grade inflammation, and that it is not a leakage of mucus resulting from a proctitis. The pruritic condition will not be improved until the phagocytic power of the blood is increased up to or near normal, and the pruritus will return if the phagocytic power of the blood is again lowered.

Local applications without the use of autogenous vaccine make no lasting improvement.

There is no necessary connection between itching and diabetes. Vaccine should be given in heavy doses. Where there is a complicating infection the vaccine of the complicating bacterium is given with streptococcic vaccine. Vaccine doses run from 850 to 1300 million to 1 Cc.

THE USE OF WHOLE BLOOD IN HEMORRHAGE.

OLIVER (*California State Journal of Medicine*, January, 1917) alludes to the commonly accepted belief that clotting of the blood depends upon the action of the fibrin ferment (which is normally formed only after the blood is shed) on the fibrinogen which is in the circulating fluid; this fibrin ferment-complex now being designated as "thrombin." He quotes Howell to the effect that when thrombin is added to fibrinogen coagulation takes place by the formation of the fibrin. Thrombin only occurs in shed blood, hence it is evident that all the elements entering into its formation must be present before it is shed; to this the name of "prothrombin" or "thrombogen" has been given.

To account for the conversion of prothrombin into thrombin, the presence of a ferment is assumed, which Morawitz has called "thrombokinase." Calcium is essential to the action of thrombokinase. The exact rôle of calcium is unknown. As to the origin of the kinase, it is known that as soon as the blood is shed there is a disintegration of the blood platelets and also of the leucocytes. Moreover, there is a marked diminution of blood plates in hemorrhagic conditions, and when these are supplied by transfusion the bleeding stops for a time, but with the reduction of these elements again hemorrhage will occur. The blood plates have been demonstrated to be the nuclei about which is concerned the formation of fibrin. It has been demonstrated that the retardation or suppression of clotting is frequently attributable to the action of an antithrombin which neu-

tralizes thrombin, and that only after the removal of the antithrombin or the addition of a further amount of thrombin can coagulation be induced. It is also possible, especially in cases of cirrhosis, that the fibrinogen content of the blood may fall, so that even in the presence of an adequate proportion of thrombin the clot formed is not sufficient.

Welch believes the underlying condition in these bleeding cases has to do with the endothelial lining of vessels, etc.; that there is a disturbance of balance of the ferments of the cells due to malnutrition evidenced by hemorrhage in the serous cavities. This is often a toxic effect.

When normal serum from whatever source is added to the blood of any of these cases, it will cause prompt clotting. From this it is reasoned that there is lacking in the blood of some otherwise normal individuals a kinase or activating substance that would normally cause coagulation. It is argued, however, that it is not for this reason that the hemorrhage stops, but because of quick nutritional repair of the damage done the endothelial lining of vessels, by action of toxins of bacteria, intestinal, septicemic, etc.

The disease "melena neonatorum" in many and perhaps all instances is characterized by a relatively sudden disappearance of prothrombin from the blood; the condition usually develops during the first two weeks after birth and is often fatal, possibly due to lack of formation in the liver of prothrombin.

Bernwald was one of the first to treat a case of hemophilia with serum in 1897. In 1902 Welch reported good results in the treatment of melena neonatorum by the use of normal human serum, probably as much as 300 Cc. He also used small doses over a long period (nine months), as much as 3500 Cc., employing it for the nutritional value.

Almost every form of serum has been used, and from all good results have been reported. Among the sera used are rabbit, horse, antitoxic sera, normal human, citrated blood, pipetted blood, and whole blood (human). The serum of animals, on account of difference of species, by reason of the metameric proteid content, is capable of sensitizing, like other foreign proteids, and produces the cardinal symptoms of anaphylaxis (serum sickness). The homologous sera do not have that effect, and are of distinct nutritive value, especially in the malnutrition of infants, who cannot take nourishment by mouth.

It has been demonstrated that the simplest, quickest, and most efficient method is to obtain about 20 Cc. of blood from the vein of a healthy person and inject immediately into the gluteal muscles of the patient. Two needles should be used—one can be inserted into the patient, so as to save time. These intramuscular injections are not painful nor do they leave any bad results, but are promptly absorbed. It seems strange with the results obtained that there have been so few reports; probably on account of the simplicity of the method.

Oliver reports six cases, none of them entirely convincing.

FLAVINE AND BRILLIANT GREEN IN THE TREATMENT OF INFECTED WOUNDS.

Browning, Gulbransen, Kennaway and Thornton (*British Medical Journal*, Jan. 20, 1917) thus set forth the defects and vices of antiseptics in common use:

Antiseptics are fixed by protein material in general; hence, when bacteria are suspended in a fluid containing abundant protein, such as serum, very little of the substance is free to act on the organisms. This explains the well-known fact that the antiseptics in common use, almost without exception, show a reduced potency when tested in serum—that is, under conditions resembling those in which they would be used in the treatment of wounds. For instance, the efficiency of corrosive sublimate is reduced one hundred times by serum.

By destroying the life of cells and inhibiting phagocytosis, antiseptics deprive the body of one of its most important weapons in combating local infection.

By producing layers of dead tissue they supply a nidus for the proliferation of organisms.

Owing to their deficient penetrating power they fail to reach organisms situated in the tissues, even supposing that they act efficiently on those disposed on the free surfaces.

The properties of the ideal antiseptic would appear to be great potency against all microörganisms in the presence of protein material—for example, serum.

No deleterious effect on phagocytosis.

Absence of irritant action on living tissues in general, so that it may be applied to delicate surfaces such as mucous membranes.

A suitable stimulating effect on connective tissue cells, so as to promote growth of healthy granulation tissue.

The compound, when absorbed, must not be highly toxic for any specialized tissue; thus, even if strychnine were the most potent antiseptic known, its effect on the central nervous system would probably entirely preclude its therapeutic use.

In the researches for an efficient antiseptic the authors have directed attention to the bacterial potency of undiluted serum as compared to that in watery solution. Of the effect on tissues of all the substances examined, the compound flavine stands out as possessing the highest sum of desirable properties for therapeutic use—that is, great antiseptic power, along with relative non-toxicity toward phagocytosis and lack of irritating effect on epithelium. The triphenylmethane compounds, especially brilliant green and crystal violet, are extremely active in the case of cocci, but toward B. coli their bactericidal value is considerably lower. On the other hand, flavine is much the most potent of all substances investigated toward both groups of organisms. In the case of B. coli suspended in serum, flavine is approached only by mercuric chloride (although the latter is about ten times weaker); but the disadvantage of the mercury salt lies in the serious effect which it has in interfering with phagocytosis. This action of mercuric chloride *in vitro* affords a striking parallel to its well-known toxic effect on living tissues. Thus, as compared with the other substances under examination, a much higher effective concentration of flavine can be brought safely into contact with the tissues, in this way allowing for dilution in the wound, and giving the best prospect of dealing efficiently with organisms which may be present.

Flavine is diamino-methyl-acridinium chloride, which was originally prepared by Benda at the desire of Ehrlich, and was found to have a very marked therapeutic effect in trypanosome infections.

The comparative inefficiency of the common antiseptics under practical conditions has been paralleled by their behavior in these tests; on the other hand, the acridine compound flavine has exhibited outstanding characters, especially high bactericidal power, which is enhanced rather than diminished by the presence of serum, combined with very little inhibitory effect on phagocytosis. The recommendation of this substance for clinical use, based on the results of the laboratory tests, has appeared to be well justified; a 1:1000 solution (equivalent on the basis of bactericidal concentration to an 80-per-cent solution of carbolic acid in the case of staphylococci) has been applied to the surface of wounds without causing pain or local irritation, and the skin has not been harmed by its use. In addition, there have been no local or general toxic effects, even when quantities of the solution have been kept in contact with the tissues for a considerable time, or when it has been injected into the tissues. The granulations which form in the presence of the acridine compounds are both of good color and texture, and the whole process of healing advances rapidly. Especially significant in regard to the action of these substances has been the retrogression observed in wounds when applications of acridine compounds have been temporarily replaced by some other agent; on reverting to their use the wounds have again become markedly less septic and the advance of healing has been resumed.

The writers would especially emphasize the possibilities in the direction of prevention of sepsis which would be likely to attend the use of flavine or brilliant green in recent wounds, applied during that dangerous period between the infliction of the wound and the establishment of an adequate local defensive mechanism (granulation tissue, etc.). It is precisely at this period that the employment of an efficient antiseptic will prove of value by leading to the destruction of virulent organisms before they have obtained a foothold and have multiplied extensively. The stimulation of tissue cells is a highly important factor at this stage, and there is reason to believe that such stimulation can be attained by the application of flavine or brilliant green. Of course, such treatment is to be used in addition to operative procedures necessary for obtaining free access. It has become the custom at the out-patient department of the Middlesex Hospital to treat all casualty cases by washing out with a 1:1000 solution of flavine, and the conclusion has been justified that a wound so treated will in all probability heal by first intention.

The author concludes as follows:

A substance belonging to the acridine group, flavine, has been found to possess extremely powerful bactericidal and antiseptic properties, which are enhanced rather than diminished by admixture with serum. In this respect flavine differs from all the powerful antiseptics in common use.

In the presence of serum flavine is the most potent bactericide of all those investigated for both staphylococcus and B. coli, and it is equally efficient for the enterococcus and for anaerobes such as B. œdematis maligni.

Flavine, in relation to its bactericidal power, is very much less detrimental to the process of phagocytosis and less harmful to the tissues than the other substances; hence much higher effective concentrations can be employed without damaging the tissues or interfering with the natural defensive mechanisms. Brilliant green also compares most favorably with the other antiseptics in these respects.

Clinical results have substantiated the estimate of the therapeutic value of flavine and brilliant green based on the characters above noted.

THE ANEURISMS OF WAR.

VON HABERER (*Arch. f. klin. Chir.*, 1916, cvii, 611; quoted in *Surgery, Gynecology and Obstetrics*, February, 1917) sums up the results of his experiences in the operative treatment of war aneurisms. He gives a collective report based on the indications and results obtained in his total of 72 cases treated operatively in the Reserve Hospital at Innsbruck.

He divides his treatment of aneurisms into three periods. In the first he treated 13 aneurisms by ligature with generally good results. In the second period he treated 29 aneurisms, 16 by ligature and 13 by suture—5 lateral, 8 circular. In the third period he treated 30 aneurisms, 6 by ligature and 24 by suture—7 lateral and 17 circular.

The situation, treatment, and results in these 72 cases are shown in the following table:

Site of the Aneurism.	Total.	Method of Treatment.			Died.	Recovered.
		Circular suture.	Lateral suture.	Ligature.		
Carotis communis*	5	3	2	..	..	5
Carotis interna	1	..	..	1	..	1
Subclavian	14	3	6	5	2	12
Axillaris	5	2	2	1	..	5
Brachialis	8	2	1	5	..	8
Radialis	1	..	..	1	..	1
Iliac	3	3	..	..	..	3
Femoralis†	18	10	..	8	3	15
Popliteal†	4	2	..	2	..	4
Tibialis antica	4	..	..	4	..	4
Tibialis postica	4	..	..	4	..	4
Tibialis ant. and post.	2	..	1	1	..	2
Maxillaris interna	1	..	..	1	..	1
Temporalis	1	..	..	1	..	1
Glutaca	1	..	..	1	..	1
Total	72	25	12	35	5	67

*One case ligatured later.
†One case amputated later.

Of the five cases with a fatal operative result, four were treated by ligature and one by suture. The results show that of 72 aneurisms operatively treated, five died and 67 recovered. Of the recovered, two were subsequently amputated; the other 65 cases

recovered without mutilation. Von Haberer believes that the correct treatment of every gunshot aneurism must be operative; and his experiences lead him to the following conclusions:

The ideal operation of every gunshot aneurism is vascular suture.

Vascular suture may be executed much oftener than is generally believed.

Vascular suture must as a general rule be circular rather than lateral, because lateral suture narrows the lumen too much, when there are large lateral defects; and because there is also the greater danger of thrombosis of the sutured region endangering the function of the suture.

Suture is not indicated in very small arteries, in which ligature assures a collateral circulation.

There will always be cases, particularly in the large arteries, in which ligature must be undertaken. Suture is excluded when there are extensive tissue defects, and especially in severe infection, the disappearance of which cannot be anticipated.

Where ligature is necessary, the ligature must be made either within the sac or close to the sac, taking the utmost care of the collaterals.

Aneurisms should be operated upon only in properly equipped hospitals, and if possible not in the field hospital. Trained assistants and an experienced surgeon are necessary. It is obvious that when there are dangerous complications, such as hemorrhage or very serious infection, aneurisms must be operated upon immediately.

The best time for an aneurism operation is between two and three weeks after the injury. During this time one is able to judge if a serious infection exists or not; and if this is evident there should be no further delay.

Slight infections may occur weeks later and even after complete healing of the wound. They do not forbid operation nor suture when indicated. In doubtful cases it is best to take the precaution of draining for a few days.

All late operations are made unnecessarily difficult by the calluses resulting in the meantime.

For the same reason, procedures such as compression of the aneurism are more harmful than useful. They only cause calluses and inflammatory changes in the sac.

In all gunshot injuries in which the projectile in its passage has struck one of the larger vessels, judgment has to be most careful, because even weeks later, when the patient moves around, an aneurism may manifest itself.

Infected aneurisms may stimulate abscesses, therefore the utmost care is advised in the examination.

Whereas in a successful vascular suture the patient can be treated as recovered after a month, this is not the case in a ligature, because here slight disturbances of the circulation remain for a considerable time, which render the man unfit for the heavy work at the front, especially in winter.

The results of vein transplantation in larger defects of the arteries are very doubtful.

The strength of a vascular suture is extremely great, as is proved by the possibility of putting a simultaneous fracture in extension immediately after circular suture.

Aneurism followed by paralysis of the nerves is very frequent, not because of lesion of the nerves through the shot, but more an account of pressure from the aneurism.

The clinical details of the 72 operated cases are given.

TREATMENT OF COMPOUND FRACTURES.

WAINWRIGHT (*Pennsylvania Medical Journal*, February, 1917) thus outlines an ideal plan for open uninfected fractures:

As to the maintaining of the fracture uninfected: The wound must be treated at the earliest opportunity. First of all free drainage must be obtained. Skin must be further incised if necessary, side pockets followed up, and, in other words, all areas exposed to infection must be made acces-

sible. Then tubes and light gauze dressings must be so arranged that irrigations with Dakin's solution either at intervals through a syringe or continuously through a Murphy drip apparatus can be kept up. A satisfactory way is to put the tube or tubes into the deepest parts of the wound and bring them out through the gauze dressings and out through a sterile bandage. The sterile bandage with the tube lying against it is then surrounded by a sterile towel conveniently pinned so that at desired intervals the nurse may unpin the towel, turn it down, and reach the tubes, which are thus constantly kept in a sterile field. The gauze inside the wound must be lightly placed with the sole purpose of holding the tubes in place. We must soon begin to accept what Sir Berkley Moynihan and a few others are just beginning to teach us, that there "never yet was such a thing as a gauze drain"—a gauze cork perhaps, and an inefficient one at that, but never a drain. Also our dressings must be light, so that Dakin's fluid may get away and there really be an irrigation. Fluids must be caught in a photographer's tray for instance, or they must even run into the bed if necessary. They must not be held back. By plugging the wound area with cotton or oil-silk dressings, which sog up the dressing and the wound and soak them in old albumin containing fluids which have not only lost their antiseptic quality but have perhaps become good culture media, we will prevent just the effect we are trying to produce.

Wainwright believes that at least in civil practice, where we get most of our wounds early, we can, by working with sufficient attention to detail, keep the large majority of our fractures in the uninfected class, and then after three or four days or perhaps longer we can treat such a fracture, even though there be an open wound, by whatever method in the individual case seems best adapted mechanically.

It is somewhat more difficult to lay down ideal principles concerning the particular types of mechanical fixation. We must, however, strenuously insist again that the ideal must be a fixation which will allow frequent dressing without disturbing the fragments. Wainwright believes that, after the preliminary treatment to render the fracture uninfected, as time goes on the fixation methods will gradually narrow down to three, namely, open operation and suture of fragments with kangaroo tendon; second, fixation by an Albee sliding graft; or, third, extension by the Steinman pin.

RINGWORM OF THE SCALP CURED BY X-RAY.

KNOWLES (*Pennsylvania Medical Journal*, February, 1917) observes that the diseased areas in ringworm of the scalp are of a round or oval shape, varying in size from a fraction of an inch to several inches in diameter; occasionally a large portion of the scalp is partially denuded of hair by coalescence of the lesions. The patches are usually covered by a fine ashen scale, through which many hair stumps emerge. The involved area has a "gooseflesh" appearance, the follicles being unusually prominent. The hairs are held loosely in the follicles and pull out with little traction. The incubation period of the disease is supposed to be three days. If the areas are untreated, the disease may last from infancy to adolescence and then disappear spontaneously. Ringworm of the scalp is a disease of childhood, and is of the greatest rarity in the adult. The large-spored fungus is more apt to give rise to small patches, the reverse holding true in regard to the small-spored type. The most contagious variety of fungus is supposed to be the microsporon audouini (small-spored type). Hair stumps, when removed from the diseased area, show macroscopically a peculiar grayish-white sheath, surrounding and closely adherent to the root portion of the hair; this consists of fungus.

The disease is readily distinguished from alopecia areata by the total baldness, unbroken and firmly attached hairs, lack of scales and absence of fungus in the latter; from seborrheic dermatitis by the reddened patches with greasy yellow scales, lack of broken-off and firmly attached hairs

in the latter; from psoriasis by the sharply marginated reddish patches covered with silvery white scales, the unbroken and firmly attached hairs; from favus by the sulphur-color cups in the latter and the presence of an entirely different type of fungus; from erythematous lupus by the age of the patient, totally bald areas with wide-open follicular mouths, the reddish color and the atrophy of the skin in the latter; and from age baldness by age, totally bald areas, lack of scale, and broken-off hairs. Naturally in all of these various conditions the absence of the ringworm fungus proves that tinea tonsurans is not present.

The complications of ringworm of the scalp are impetigo, a disease starting as a pustule or vesicle and drying up into yellow, honey color, "stuck on crusts," furunculosis, and subcutaneous abscesses.

The average case of ringworm of the scalp is curable by older medical methods in from six to nine months, and in certain instances a longer period is required. When the Roentgen ray is employed the patient is rendered incapable of communicating the disease in from twenty-five to thirty days after the exposure. In the treatment of favus the salve or lotion method has to be employed over a period of years, while the Roentgen ray eradicates the disease after one thorough depilation.

The commoner medical remedies employed are sulphur, mercury (usually the bichloride), iodine (commonly a 25-per-cent alcoholic solution), chrysarobin, and pyrogallol. Exclusive of the Roentgen rays Knowles has obtained the best results with the two following preparations: One drachm of the crystals of iodine mixed with 7 drachms of goose grease; and 20 grains of chrysarobin combined with an ounce of lanolin. Although numerous investigators have attempted vaccine treatment, Strickler is the strongest advocate of this method.

Depilation by means of the Roentgen rays was introduced by Sabouraud in 1904; he described the method employed by himself and Noire in one hundred cases with one exposure of each patch. Divided or intensive methods of treating this affection have been perfected by Holzknecht, Kienboch, Adamson, Coolridge, MacLeod, and MacKee. The three usually employed are those devised by Sabouraud, Kienboch-Adamson, and Holzknecht. Tint B (Hampson's No. 4) of Sabouraud's scale equals five Holzknecht units, which is the equivalent of 10 X units of Kienboch. Knowles has employed Hampson's radiochronometer, which is modeled after the Sabouraud scale.

The patient's hair having been clipped, if there is more than one patch, mark each one by drawing a circle about it with ink, and, after being exposed to the ray, mark with a cross to show that it has been treated. Each patch if isolated from the others is to be rayed in succession at the same sitting; the other patches being covered by lead plates to protect them from a double exposure. If there are many disseminated lesions involving the whole scalp, it should be marked off in segments and each section similarly treated. The patch should be six inches from the anticathode and held at the same distance by the tripod of the tube throughout the whole exposure. This spot must be exposed to the rays until the pastille assumes the color of tint No. 4 (Hampson). The length of exposure varies on different days and cannot be fixed. Fifteen days after the exposure the hairs loosen and begin to fall. Three days later the scalp is given a brisk shampoo with sulphur soap; this is repeated for several days, after which time the area which has been rayed is usually completely bald. The area so treated remains bald for approximately two months, after which a fine downy growth of hair is observed. Total restitution of the hair is usually completed in four months.

If the first exposure is insufficient to produce epilation, a second séance may be necessary four weeks after the original exposure; the latter may be carried out without fear of producing permanent baldness. By using a hard tube the maximal safe dose may be obtained in seven minutes with the

patient eight inches from the anticathode. A softer tube, which should always be used with greatest care, changes the pastille to tint No. 4 with a shorter exposure. Depilation of the entire scalp was required in but ten of the eighty-three cases treated. Sabouraud has treated 2000 cases by this method without any cerebral or intellectual symptoms arising therefrom.

The Roentgen-ray treatment of ringworm of the scalp is a step forward in the cure of an exceedingly chronic and troublesome affection.

EARLY CARE OF SUPPURATIVE CONDITIONS OF THE MIDDLE EAR AND MASTOID.

WEINBERGER (*Pennsylvania Medical Journal*, February, 1917) holds that the two great factors in treatment are the removal of the source of infection and the increasing of bodily resistance. In spite of our best care, patients occasionally develop mastoiditis. They should then be put to bed at once and have cold applied to the mastoid region.

The mastoid may recover permanently, especially so if the source of infection ceases to exist.

The mastoid may become operative. Determination of the exact time when a mastoid becomes operative is rather difficult and somewhat of a personal equation. Generally speaking, operation should be performed for two reasons: (*a*) To give the patient the safest and quickest chance for recovery, and (*b*) to preserve good hearing.

Operation should not be deferred when we feel convinced that the chances of uncomplicated recovery and good hearing would be jeopardized by delay. It is well, however, first to allow nature the opportunity to develop resistance to the particular infection in the system generally, and to establish a barrier against its extension locally. We should then give assistance by removing every single infected cell, for a poorly drained mastoid is just as liable to recur, and bring on complications or leave a chronic running ear, as a preëxisting unoperated mastoid with persisting nose and throat infection.

Although clinical findings are not an absolute guide, yet careful weighing of clinical evidence gives us a fair indication for the time best suited and safest for operation. A culture of the middle-ear discharge, when obtainable, should be made and the offending organism and the probable severity of the infection determined. The streptococcus capsulatus is particularly rapid in its destruction and extension to adjacent structures, and is especially dangerous.

Skiagraphs should be made of both mastoids, and when interpreted by a competent roentgenologist are of great value.

A differential white blood count repeated at intervals of twelve hours, if no operation is performed, is important, for having found the character of infection it gives us a fair idea of the amount and rapidity of destruction in a given time. Temperature, severity of pain, and degree of tenderness are to be relied upon only as they assist in interpreting the main factors, namely, character of infection, skiagraph, and differential white blood count. We know that operative mastoids occur in which no discharge becomes manifest either before or at the time of operation, and the amount of discharge varies so that in some cases we can hardly imagine how it is possible for so much pus and serum to be formed and drain through the opening in the drum. Intermittent, remittent, or early sudden cessation of discharge with or without pain is unfavorable, as is increasing pain and tenderness. The symptoms cannot be relied upon, however, without being often led astray in interpreting the main consideration. A bulging posterior wall is unfavorable, but not an absolute and positive indication for operation, particularly so when there is no discharge. We cannot afford, however, to wait for its appearance when at any time pus has been or is manifest, and it is distinctly unsafe to delay operation if present under these conditions.

The principles involved in the surgery of

purulent conditions of the middle ear and mastoid are precisely the same as in the surgery of pus conditions generally—namely, early and thorough drainage. It is far better to operate on a mastoid that might possibly have recovered from the attack without operation than to subject the patient to the deleterious and dangerous intracranial complications with the high mortality occasionally consequent on the delay, uncertainty, and procrastination incident to the questionable hope of ultimate recovery, because (*a*) operation stops bone necrosis about vital structures; (*b*) the ear is dry and the drum intact—thus the patient is not subjected to any future chronic discharge with its constantly attendant danger of labyrinthine involvement and intracranial complications; (*c*) perfect hearing results; (*d*) the operative mortality of early uncomplicated mastoids is very low; (*e*) the period of illness, pain, suffering, and anxiety is very much shortened.

The conditions may enter upon the chronic stage. At the end of four weeks we regard the discharging ear as entering this stage providing that previously acute conditions have subsided or disappeared, and bodily resistance has been increased by means of autogenous vaccines, and attending source of infection in the nose or throat has been removed.

Autogenous vaccines are of very little value unless properly prepared. When the vaccine is that of the primarily causative organism the benefit derived from its use is often remarkable, and never fails to produce an effect upon the discharge. All extraneous and contaminating organisms must be isolated and ignored by plate cultures, the material for culture having been obtained aseptically from the middle ear by means of a fine cotton-tipped probe directly to the opening in the drum. One or two injections at intervals of five days will usually effect a cure; occasionally several more are needed, but when it is necessary to give more than two injections the author feels that the vaccine is not what it should be and makes a new one.

REVIEWS.

ANATOMICAL NAMES, ESPECIALLY THE BASEL NOMINA ANATOMICA. ("BNA.") By Albert Chauncey Eycleshymer, B.S., Ph.D., M.D., Assisted by Daniel Martin Schoemaker, B.S., M.D. With Biographical Sketches, by Roy Lee Moodie, A.B., Ph.D. Illustrated by numerous wood engravings and by two full-page plates in red and black. Extra muslin, $4.50 net. William Wood & Co., New York, 1917.

This volume is designed to give a "complete and correct list of BNA terms." Approximately one-half of the book is an index, whereby anatomical terms of divers sorts may readily be referred to their correct equivalents in the BNA nomenclature. An interesting and valuable biographical list is likewise incorporated in the volume.

Wilhelm His in 1889 suggested the appointment of a commission on anatomical nomenclature. This commission consisted of Kolliker (chairman), O. Hertwig, His, Kollmann, Merkel, Schwalbe, Toldt, Waldeyer, and v. Bardeleben. The Anatomical Society voted the adoption of the report of the Commission on Nomenclature at the session in Basel in 1895. The expression BNA is an abbreviated title for the list of approximately 4500 anatomical terms accepted at this meeting.

The BNA since its adoption in 1895 has steadily grown, and most of the leading text-books of anatomy now make use of the BNA terms. It is essential that physicians, laboratory investigators, and students familiarize themselves with the BNA nomenclature, so that they may deal intelligently with the newer anatomical literature.

There are, doubtless, many inconsistencies in the BNA. Some of the names are ill chosen. Indeed, in many instances, the old

names are to be preferred. However, an ideal and flawless anatomical terminology may be impossible. Comparative anatomy is the only sane basis for an anatomical nomenclature. However, when one views the vastness of the field and the many variations in structure in comparative anatomy, one sees the difficulty in formulating a satisfactory list of names for anatomical structures. Certainly the BNA is the most satisfactory list of names offered up to the present, and until we have something better it should be more generally used.

Professor Eycleshymer and his assistants are to be congratulated in compiling this work. The book not only gives the BNA names, but by a method of cross-reference the equivalents in the BNA are readily found. The added biographical list by Dr. Moodie is instructive and helpful and gives a touch of completeness. The book is, without doubt, the most complete and valuable reference work of its kind in the English language. J. P. S.

FOOD AND THE PRINCIPLES OF DIETETICS. By Robert Hutchison, M.D., F.R.C.P. Illustrated. Fourth Edition. William Wood & Company, New York, 1917. Price $4.00.

The earlier editions of this book have been referred to in terms of commendation in the THERAPEUTIC GAZETTE. Dr. Hutchison is Physician to the London Hospital, and in charge of the out-patients in the Great Ormond Street Hospital for Sick Children. The text in the present edition has been thoroughly revised, and the important subject of vitamines has been introduced in a new section.

The book contains a little over six hundred pages and is one of the best upon the important subject of which it treats. Opening with the definition that food "is anything which when taken into the body is capable either of repairing its waste or of furnishing it with material from which to produce heat or nervous and muscular work," it proceeds, page by page, from fundamental facts concerning dietetics to the employment of various foods in health and disease.

BETTER BABIES. A Guide for the Practical Care of the Mother and Young Child. By Samuel A. Visanska, M.D. Foote & Davies Company, Atlanta, Ga., 1917.

This is a book, with large type and wide spacing, which covers a little less than two hundred and fifty pages. The author states that his reason for writing it has not only been "to see the world filled with better babies," but also that he might present views and facts which he thinks will prove useful to his professional colleagues in the care of infants who may come under their charge. It is also written in such a way that it may be put into the hands of the mother and nurse. The illustrations give practical points in regard to the use of the abdominal binder and diaper, and considerable information is given concerning food, sleep, and general care.

THE REPORT OF THE PATHOLOGICAL DEPARTMENT AND THE DEPARTMENT OF PSYCHIATRY OF THE CENTRAL INDIANA HOSPITAL FOR THE INSANE. By George F. Edenharter, M.D., Superintendent, Indianapolis, Ind.

The present volume represents No. 6 in the series which have been published by the Staff of this institution, and consists of two parts—one giving a summary of the year's work in the Department of Clinical Psychiatry and Pathology, with papers read and published during 1913-1914, and the second part with similar work done during 1914-1915. The report also gives us information in regard to the course which has been authorized in Mental Pathology and in Nervous Diseases by different members of the Staff, so that physicians and students may go to the institution and gain additional information. The publication is creditable alike to the State which publishes it and to the medical men who have brought together within its covers a large amount of valuable material.

TRAUMATIC SURGERY. By John J. Moorhead, M.D., F.A.C.S. W. B. Saunders Company, Philadelphia and London, 1917. Price, cloth, $6.50 net; half morocco, $8.00 net.

This book, dedicated by the distinguished author to his wife, is designed to place in one volume the information necessary to diagnose and treat all the usual and most

of the unusual effects of accident and injury. It embodies the measures which the writer has found most practical in his own experience, and shows an effort to standardize the treatment of wounds, infections, burns, and the usual fractures.

Moorhead has a fixed and abiding belief in the value of open air and sunshine in the case of infected wounds in any location and from any source. Indeed, he states that aeropathy and heliotherapy make skin-grafting unnecessary.

The book is profusely and very excellently illustrated. There are evidences of careful study of current literature, the conclusions from which seem to be adopted and recommended at times on grounds which even to a kindly reviewer would seem inadequate.

In Dupuytren's contracture the author is especially interested; he devotes considerable space to electrical injuries, those incident to compressed air and illuminating gas, traumatic appendicitis, and traumatic neuroses. He appends a table of tests and standards. He also discusses X-ray Burns, and has a final section on what he calls Medico-legal Phases.

The book is filled with useful information; nor can any one read it without profit. Perhaps a minor criticism might be to the effect that this information does not always seem to be thoroughly digested.

THE PRACTICE OF UROLOGY. By Charles H. Chetwood, M.D., LL.D., F.A.C.S. Illustrated, Second Edition. William Wood & Co., New York, 1916.

The second edition of this book, admirable both in text and illustration, will be hailed with satisfaction not only by the expert worker in this branch of surgery, but by both general practitioners and students, since it has been written on broad lines, but with that satisfactory attention to detail most useful to him who consults it for guidance in the treatment of cases with which he is not largely experienced.

The book opens with a brief section on anatomy, with special reference to its surgical bearing. Thereafter follow sections on the diagnosis of sexual and urinary maladies and general technique. Chapters on Sero-diagnosis, Sero-therapy, Functional Renal Diagnosis, and Roentgenography, together with Maladies of the Penis and the Surgery of the Urinary and Genital Tracts, are systematically written; the chapters upon Renal Disturbances are particularly commendable.

The book closes with a section upon Syphilis. The treatment laid down is characterized by sound common sense based on ripe experience and on the practical knowledge of all the newer theories and procedures.

SYPHILIS. By Loyd Thompson, Ph.B., M.D. Illustrated. Lea & Febiger, Philadelphia and New York, 1916.

An admirable work, brief, lucid, and convincing. The author states that syphilis as a disease requires knowledge in all fields of medicine. The subject has been presented in a thoroughly practical manner. Hence the work centers largely on Diagnosis and Treatment, with especial attention called to the need of laboratory aid.

There is a section on the history of the disease, calling attention to its importance from the standards of geographic distribution and economic bearings; and one upon the etiology, followed by the pathology, clinical history, and clinico-laboratory diagnosis; with an excellent section upon prognosis; one upon prophylaxis both present and to be; and, finally, one upon treatment viewed from all sides.

The second portion of the book is taken up in accordance with systems, the Circulatory System being first considered. Thereafter the Respiratory Tract; the Gastrointestinal Tract, the Gall-Bladder, Spleen and Pancreas, etc.

The third part is devoted to Congenital Syphilis, considered both broadly and by regions.

It is decidedly the most satisfactory book that has recently appeared on the subject, one showing the wide knowledge of the work of both the clinician and scientist, supplemented by a singularly extensive personal experience. It is a book as helpful to the specialist as it is to the general practitioner.